Vol. 1081 Number 3

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

August 18, 1987

U.S. DEPARTMENT OF COMMERCE

Patent and Trademark Office

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OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $6.00 each; copies of TRADEMARKS at $1.00 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

Domestic PCT Fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Apr. 1, 1987 and was announced in the *Official Gazette* at 1077 O.G. 3 on Apr. 7, 1987.

International PCT fees were changed due to differences in the exchange rate and International PCT Chapter II fees effective July 1, 1987 were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

The national fees effective July 1, 1987 for entering the U.S. Patent and Trademark Office as a designated or elected Office as announced in the *Official Gazette* at 1079 O.G. 32, on June 16, 1987 are included for convenience of applicants.

The current schedule of PCT fees is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office as Searching Authority (ISA)	
—No corresponding prior U.S. national application filed:	520.00
—Corresponding prior U.S. national application filed:	350.00
—Supplemental search fee, per additional invention	140.00
European Patent Office as Searching Authority	1180.00
Preliminary examination fee	
U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as Searching Authority	370.00
—Additional examination fee, per additional invention	125.00
—Searching Authority not the USPTO	570.00
—Additional examination fee, per additional invention	190.00
International fees	
Basic fee:	485.00
Basic Supplemental fee (for each page over 30):	10.00
Designation fee for the first 10 national or regional offices:	120.00
Designation fee for 11th and subsequent designations:	No Charge
Handling fee	150.00
Supplement to the handling fee	150.00

U.S. National Stage fees

	Small Entity	Non-Small Entity
U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA)	150.00	300.00
USPTO was ISA but not IPEA	170.00	340.00
USPTO was neither ISA nor IPEA	225.00	450.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(1) to (4)	25.00	50.00
—For each independent claim in excess of 3	17.00	34.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	55.00	110.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1	55.00	110.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1	26.00	26.00

June 2, 1987.

DONALD J. QUIGG,
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on August 14, 1984, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,464,795 through 4,466,134
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and

(h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:
By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:
By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98–622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED MAY 31, 1987, DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,385,404	06/236,976	5/31/83
4,385,412	06/285,875	5/31/83
4,385,415	06/239,688	5/31/83
4,385,429	06/259,034	5/31/83
4,385,440	06/229,638	5/31/83
4,385,441	06/311,036	5/31/83
4,385,445	06/311,502	5/31/83
4,385,447	06/268,481	5/31/83
4,385,453	06/258,324	5/31/83
4,385,454	06/307,735	5/31/83
4,385,456	06/241,265	5/31/83
4,385,457	06/309,570	5/31/83
4,385,459	06/344,512	5/31/83
4,385,460	06/236,326	5/31/83
4,385,463	06/263,417	5/31/83
4,385,465	06/264,005	5/31/83
4,385,469	06/257,582	5/31/83
4,385,477	06/314,127	5/31/83
4,385,489	06/275,465	5/31/83
4,385,497	06/289,505	5/31/83
4,385,502	06/297,103	5/31/83
4,385,506	06/217,902	5/31/83
4,385,516	06/236,061	5/31/83
4,385,527	06/283,525	5/31/83
4,385,538	06/237,847	5/31/83
4,385,540	06/257,520	5/31/83
4,385,544	06/231,860	5/31/83
4,385,547	06/233,712	5/31/83
4,385,548	06/247,620	5/31/83
4,385,555	06/266,812	5/31/83
4,385,561	06/230,465	5/31/83
4,385,573	06/262,167	5/31/83
4,385,576	06/319,169	5/31/83
4,385,577	06/289,336	5/31/83
4,385,578	06/262,186	5/31/83
4,385,581	06/338,220	5/31/83
4,385,590	06/329,645	5/31/83
4,385,591	06/257,348	5/31/83
4,385,593	06/253,779	5/31/83
4,385,598	06/215,720	5/31/83
4,385,605	06/310,028	5/31/83
4,385,610	06/260,955	5/31/83
4,385,621	06/301,021	5/31/83
4,385,624	06/273,435	5/31/83
4,385,631	06/245,111	5/31/83
4,385,633	06/277,278	5/31/83
4,385,635	06/264,048	5/31/83
4,385,638	06/281,896	5/31/83
4,385,647	06/238,610,	5/31/83
4,385,655	06/397,794	5/31/83
4,385,656	06/286,658	5/31/83
4,385,679	06/234,885	5/31/83
4,385,687	06/309,924	5/31/83
4,385,695	06/279,428	5/31/83
4,385,696	06/294,946	5/31/83
4,385,698	06/366,716	5/31/83
4,385,701	06/263,914	5/31/83
4,385,713	06/248,558	5/31/83
4,385,722	06/259,690	5/31/83
4,385,723	06/285,864	5/31/83
4,385,724	06/252,438	5/31/83
4,385,731	06/306,324	5/31/83
4,385,734	06/224,688	5/31/83
4,385,736	06/240,974	5/31/83
4,385,738	06/281,086	5/31/83
4,385,745	06/258,659	5/31/83
4,385,750	06/266,980	5/31/83
4,385,751	06/307,363	5/31/83
4,385,753	06/239,742	5/31/83
4,385,759	06/270,575	5/31/83
4,385,764	06/302,166	5/31/83
4,385,765	06/236,983	5/31/83
4,385,766	06/299,712	5/31/83
4,385,771	06/286,859	5/31/83
4,385,778	06/309,312	5/31/83
4,385,780	06/227,436	5/31/83
4,385,785	06/257,189	5/31/83
4,385,815	06/309,125	5/31/83
4,385,816	06/336,800	5/31/83
4,385,824	06/300,239	5/31/83
4,385,828	06/238,571	5/31/83
4,385,847	06/279,761	5/31/83
4,385,852	06/305,541	5/31/83
4,385,857	06/227,556	5/31/83
4,385,882	06/318,049	5/31/83
4,385,884	06/228,660	5/31/83
4,385,889	06/294,370	5/31/83
4,385,900	06/311,332	5/31/83
4,385,904	06/344,322	5/31/83

Patent Number	Serial Number	Issue Date
4,385,905	06/284,605	5/31/83
4,385,909	06/297,656	5/31/83
4,385,910	06/334,009	5/31/83
4,385,911	06/341,681	5/31/83
4,385,913	06/325,510	5/31/83
4,385,914	06/323,475	5/31/83
4,385,934	06/393,852	5/31/83
4,385,940	06/224,480	5/31/83
4,385,953	06/331,590	5/31/83
4,385,968	06/302,804	5/31/83
4,385,990	06/335,552	5/31/83
4,385,999	06/291,161	5/31/83
4,386,008	06/288,153	5/31/83
4,386,014	06/287,385	5/31/83
4,386,030	06/320,792	5/31/83
4,386,031	06/318,964	5/31/83
4,386,035	06/301,510	5/31/83
4,386,040	06/297,609	5/31/83
4,386,051	06/400,939	5/31/83
4,386,063	06/292,394	5/31/83
4,386,064	06/380,422	5/31/83
4,386,082	06/352,687	5/31/83
4,386,083	06/303,003	5/31/83
4,386,084	06/322,670	5/31/83
4,386,088	06/304,128	5/31/83
4,386,090	06/331,484	5/31/83
4,386,101	06/319,865	5/31/83
4,386,122	06/301,876	5/31/83
4,386,126	06/297,246	5/31/83
4,386,131	06/320,300	5/31/83
4,386,141	06/351,048	5/31/83
4,386,148	06/262,009	5/31/83
4,386,151	06/400,906	5/31/83
4,386,184	06/265,931	5/31/83
4,386,189	06/260,828	5/31/83
4,386,206	06/306,783	5/31/83
4,386,207	06/321,055	5/31/83
4,386,213	06/278,647	5/31/83
4,386,214	06/326,422	5/31/83
4,386,246	06/328,337	5/31/83
4,386,270	06/271,557	5/31/83
4,386,271	06/284,185	5/31/83
4,386,276	06/318,035	5/31/83
4,386,296	06/218,042	5/31/83
4,386,299	06/218,986	5/31/83
4,386,307	06/219,169	5/31/83
4,386,308	06/249,411	5/31/83
4,386,319	06/250,618	5/31/83
4,386,342	06/249,745	5/31/83
4,386,344	06/254,922	5/31/83
4,386,368	06/306,605	5/31/83
4,386,411	06/221,268	5/31/83
4,386,418	06/335,042	5/31/83
4,386,434	06/271,351	5/31/83

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

4,503,062, Re. S.N. 021,220, Filed Mar. 3, 1987, Cl. 514/383, AZOLYL SUBSTITUTED ALICYCLIC ALCOHOLS, Michael B. Gravestock, Owner of Record: *Imperial Chemical Industries PLC, London, England,* Attorney or Agent: Paul N. Kokulis, et al., Ex. Gp.: 125

4,510,492, Re. S.N. 033,777, Filed Apr. 3, 1987, Cl. 340/825.05, MESSAGE COMMUNICATION METHOD AND SYSTEM, Kinji Mori, et al., Owner of Record: *Hitachi Ltd., Tokyo, Japan,* Attorney or Agent: Donald R. Antonelli, et al., Ex. Gp.: 264

4,522,876, Re. S.N. 060,400, Filed June 10, 1987, Cl. 428/285, INTEGRAL TEXTILE COMPOSITE FABRIC, John J. Hiers, Owner of Record: *Lydall, Inc., Manchester, Conn.,* Attorney or Agent: Robert B. Murray, et al., Ex. Gp.: 154

4,525,585, Re. S.N. 063,210, Filed June 17, 1987, Cl. 536/98, SODIUM CARBOXYMETHYLCELLULOSE, Atsushi Taguchi, et al., Owner of Record: *Daicel Chemical Industries, Ltd., Osaka, Japan,* Attorney or Agent: L. Martin Flynn, et al., Ex. Gp.: 155

4,553,739, Re. S.N. 063,683, Filed June 19, 1987, Cl. 256/23, FLEXIBLE BARRIER HOLDING AND MANIPULATING MECHANISM, Richard M. Baines, Owner of Record: *Inventor,* Attorney or Agent: George M. Hokins, et al., Ex. Gp.: 351

4,571,907, Re. S.N. 059,852, Filed June 8, 1987, Cl. 52/239, FRAMES CONNECTOR SYSTEM, Jerry A. Defouw, et al., Owner of Record: *Herman Miller, Inc., Zeeland, Mich.,* Attorney or Agent: John E. McGarry, et al., Ex. Gp.: 245

4,572,872, Re. S.N. 061,674, Filed June 15, 1987, Cl. 428/423.1, GLASS-RUN FOR WINDOW GLASS OF MOTOR CAR, Yoshio Yamazaki, et al., Owner of Record: *Toyoda Gosei Co., et al., Aichi, Japan,* Attorney or Agent: Paul N. Kokulis, et al., Ex. Gp.: 154

4,596,630, Re. S.N. 063,466, Filed June 17, 1987, Cl. 162/50, PROCESS FOR THE ELECTROCHEMICAL REDUCTIVE BLEACHING OF LIGNECELLULOSIC PULP, Michael N. Hull, et al., Owner of Record: *International Paper Co., New York, N.Y.,* Attorney or Agent: Edwin M. Luedeka, et al., Ex. Gp.: 133

4,605,889, Re. S.N. 048,959, Filed May 12, 1987, Cl. 322/61, BRUSHLESS TACHOMETER/SYNCHRA, John R. Luneau, Owner of Record: *Resolvex Corp., Meredith, N.H.,* Attorney or Agent: Alfred C. Body, et al., Ex. Gp.: 212

4,616,652, Re. S.N. 035,461, Filed Apr. 7, 1987, Cl. 128/344, DILATATION CATHETER POSITIONING APPARATUS, John B. Simpson, Owner of Record: *Advanced Cardiovascular Systems, Inc., Mountain View, Calif.,* Attorney or Agent: Paul D. Flehr, et al., Ex. Gp.: 333

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexaminstion will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

3,633,070, Reexam. No. 90/001,274, Requested: July 2, 1987, Cl. 361/46, GROUND FAULT CURRENT INTERRUPTER, Louis J. Vassos, Owner of Record: *Leviton Mftg. Co., Inc., Little Neck, N.Y.,* Attorney or Agent: Paul J. Sutton, Ex. Gp.: 210, Requester: Owner

3,905,809, Reexam. No. 90/001,270, Requested: June 29, 1987, Cl. 420/578, ALLOY FOR MAKING DUCTILE IRON, Andrew B. Malizio, et al., Owner of Record: *U.S. Pipe & Foundry Co., Birmingham, Ala.,* Attorney or Agent: James W. Grace, Ex. Gp.: 110, Requester: Globe Metallurgical, Inc., Beverly, Ohio

4,028,963, Reexam. No. 90/001,267, Requested: June 25, 1987, Cl. 74/604, ENGINE BALANCER, Hirokazu

Nakamura, Owner of Record: *Mitsubishi Jidosha Kogyo K.K., Tokyo, Japan,* Attorney or Agent: Robert E. Burns, Ex. Gp.: 350, Requester: DR ING. h.c.f. Porsche Aktiengesellschaft, Weissach, Germany

4,086,297, Reexam. No. 90/001,278, Requested: July 10, 1987, Cl. 524/330, METHOD OF MAKING POLYMERIC COMPOSITIONS AND COMPOSITIONS THEREFOR, Nuno M. Rei, et al., Owner of Record: *Ventron Corp., Beverly, Mass.,* Attorney or Agent: Unknown, Ex. Gp.: 150, Requester: Morton Thiokol, Inc., Chicago, Ill.

4,096,226, Reexam. No. 90/001,269, Requested: June 26, 1987, Cl. 264/168, INTEGRATED SPIN-DRAW-TEXTURIZING PROCESS FOR MANUFACTURE OF TEXTURIZED POLYAMIDE FILAMENTS, Wolfgang Martin, et al., Owner of Record: *BASF Aktiengesellschaft, Ludwigshafen, Germany,* Attorney or Agent: Robert B. Keil, Ex. Gp.: 130, Requester: Owner

4,205,028, Reexam. No. 90/001,275, Requested: July 1, 1987, Cl. 264/24, FORMING PROTECTIVE SKIN ON INTRICATELY MOLDED PRODUCTS, Walter H. Brueggemann, Owner of Record: *Ferro Corp., Cleveland, Ohio,* Attorney or Agent: Unknown, Ex. Gp.: 150, Requester: Morton Thiokol, Inc., Chicago, Ill.

4,228,113, Reexam. No. 90/001,276, Requested: July 1, 1987, Cl. 264/24, PROCESS FOR MAKING OBJECTS FROM MINERAL FILLERS BONDED WITH A THERMOSETTING RESIN, Rene L. E. Van Gasse, Owner of Record: *Stamicarbon B.V., Geleen, Netherlands,* Attorney or Agent: Cushman, Darby, et al., Ex. Gp.: 150, Requester: Morton Thiokol, Inc., Chicago, Ill.

4,335,529, Reexam. No. 90/001,266, Requested: June 10, 1987, Cl. 36/59, TRACTION DEVICE FOR SHOES, Michael Badalamenti, Owner of Record: *Inventor, Ortonville, Mich.,* Attorney or Agent: Brooks & Kushman, Ex. Gp.: 240, Requester: Owner

4,349,601, Reexam. No. 90/001,277, Requested: July 1, 1987, Cl. 428/323, PROTECTIVE SKIN ON INTRICATELY MOLDED PRODUCTS, Walter Brueggemann, et al., Owner of Record: *Ferro Corp., Cleveland, Ohio,* Attorney or Agent: Milton L. Simmons, Ex. Gp.: 150, Requester: Morton Thiokol, Inc., Chicago, Ill.

4,588,580, Reexam. No. 90/001,271, Requested: July 6, 1987, Cl. 424/21, TRANSDERMAL ADMINISTRATION OF FENTANYL AND DEVICE THEREFOR, Robert M. Gale, et al., Owner of Record: *Alza Corp., Palo Alto, Calif.,* Attorney or Agent: Steven F. Stone, Ex. Gp.: 150, Requester: Cygnus Corp., Redwood City, Calif.

4,590,156, Reexam. No. 90/001,272, Requested: June 29, 1987, Cl. 435/5, AGGLUTINATION ASSAY AND PRODUCT FOR RUBELLA ANTIBODY, Preston H. Dorsett, Owner of Record: *The University of Tennessee Research Corp., Knoxville, Tenn.,* Attorney or Agent: Carella, Byrne, et al., Ex. Gp.: 120, Requester: Owner

4,615,934, Reexam. No. 90/001,280, Requested: July 6, 1987, Cl. 428/254, WARP KNIT WEFT INSERTION FABRIC AND PLASTIC SHEET REINFORCED THEREWITH, James R. Ellison, Owner of Record: *Peabody ABC Corp., Warsaw, Ind.,* Attorney or Agent: Ronald J. St. Onge, Ex. Gp.: 150, Requester: Owner

4,620,261, Reexam. No. 90/001,279, Requested: July 6, 1987, Cl. 361/154, APPARATUS AND METHOD FOR CONTROLLING ELECTROMAGNETIC CLUTCHES AND THE LIKE, James P. Thornton, Owner of Record: *Fairchild Weston Systems, Inc., Archbald, Pa.,* Attorney or Agent: Dale Gaudier, Ex. Gp.: 210, Requester: Warner Electric Brake & Clutch Co., South Beloit, Ill.

4,636,818, Reexam. No. 90/001,268, Requested: June 26, 1987 Cl. 346/213, CARBONLESS SYSTEM INCLUDING SOLVENT-ONLY MICROCAPSULES, Richard J. Jerabek, Owner of Record: *Moore Business Forms, Inc., Grand Island, N.Y.,* Attorney or Agent: Allegretti, Newitt, et al., Ex. Gp.: 150, Requester: Appleton Papers, Inc., Appleton, Wis.

4,641,780, Reexam. No. 90/001,273, Requested: July 1, 1987, Cl. 239/150, SPRAYING APPARATUS, Thomas J. Smrt, Owner of Record: *Inventor, Cary, Ill.,* Attorney or Agent: Unknown, Ex. Gp.: 310, Requester: Owner

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Service by Publication

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceedings sent by registered mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, its assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Oculon, Inc., Glen Rock, N.J., Reg. No. 1,363,152, for the mark "HAND-E-VAC", Canc. No. 16,124.

Just Phones, Inc., Santa Ana, Calif., Reg. No. 1,304,324, for the mark "JUST PHONES", Canc. No. 15,931.

ERMA S. BROWN,
Administrator
of the Trademark Trial
and Appeal Board.
For MARGARET M. LAURENCE,
Assistant Commissioner
for Trademarks.

Registration to Practice

The following list contains the names of persons applying for registration to practice before the United States Patent and Trademark Office. These persons have been given provisional recognition pursuant to 37 CFR 10.9(a) to prepare and prosecute patent applications before the Office. Final approval for registration is subject to establishing to the satisfaction of the Director of the Office of Enrollment and Discipline that the person seeking registration is of good moral character and repute. [37 CFR 10.7(a)]. Accordingly, any information tending to affect the eligibility of any of the following applicants on moral, ethical, or other grounds should be furnished the Director, Office of Enrollment and Discipline on or before Sept. 11, 1987:

Bailey, Robert W. B., 375 Cordova St., Winnipeg, Manitoba, Canada R3N 1A5
Binder, Mark W., 7409 Fairchild Dr., Alexandria, Va. 22306
Clark, Terry L., 222 S. Virginia Ave., Falls Church, Va. 22046
Griffiths, John E., 114 Delview Dr., Wilmington, Del. 19810
Ito, Yoji, 7720 Tremayne Pl., #305, McLean, Va. 22102
Krizmanich, George H., 14609 Melinda La., Rockville, Md. 20853
Truhe, Joseph V., Sr., 8764 Granada Blvd., Orlando, Fla. 32819
Vinyard, Sherri E., 1501 Harbor Bay Pkwy., Alameda, Calif. 94501

CAMERON WEIFFENBACH,
July 22, 1987. *Director, Office of*
Enrollment and Discipline.

Removal from Register

Pursuant to the provisions of 37 C.F.R. §10.11(b), a letter was directed on June 23, 1987, to Mr. Hiram A. Sturges at 516 Omaha Grain Exchange Bldg., Omaha, Nebr. 68102, the last post office address furnished by him to the Office of Enrollment and Discipline. The letter was returned to the Patent and Trademark Office marked "Return to Sender — No Forwarding Order on File — Unable to Forward".

Accordingly, his name is being removed from the Register of Agents.

July 15, 1987.

CAMERON WEIFFENBACH,
Director, Office of
Enrollment and Discipline.

PATENT NOTICES

Certificates of Correction for the Week of Aug. 18, 1987

B1. 4,302,440	4,631,422	4,648,748	4,659,021
D. 286,240	4,631,920	4,648,980	4,659,110
4,439,717	4,632,702	4,649,289	4,659,286
4,473,795	4,632,892	4,649,454	4,659,335
4,473,995	4,632,957	4,650,067	4,659,429
4,494,160	4,633,026	4,650,289	4,659,475
4,506,375	4,633,845	4,650,442	4,659,599
4,511,584	4,634,513	4,650,623	4,659,742
4,537,784	4,635,357	4,650,799	4,659,890
4,540,763	4,635,499	4,650,896	4,659,894
4,551,904	4,635,788	4,651,200	4,659,910
4,551,915	4,638,210	4,651,395	4,660,226
4,562,124	4,638,230	4,651,739	4,660,264
4,562,169	4,638,284	4,652,249	4,661,084
4,575,659	4,638,600	4,652,266	4,661,092
4,590,801	4,639,857	4,652,360	4,661,138
4,595,481	4,639,875	4,652,550	4,662,446
4,597,083	4,640,501	4,653,027	4,662,630
4,600,484	4,641,516	4,653,080	4,662,762
4,601,224	4,642,342	4,653,841	4,662,935
4,607,116	4,643,062	4,654,128	4,662,990
4,607,249	4,643,078	4,654,304	4,663,370
4,607,646	4,643,081	4,654,529	4,663,393
4,609,818	4,643,692	4,655,122	4,663,517
4,609,828	4,643,805	4,655,429	4,664,110
4,610,050	4,643,993	4,655,505	4,664,254
4,613,160	4,644,706	4,656,105	4,664,687
4,613,630	4,644,718	4,656,717	4,664,996
4,613,659	4,644,779	4,656,721	4,665,049
4,613,740	4,644,917	4,657,129	4,665,207
4,614,071	4,644,990	4,657,272	4,665,318
4,616,031	4,646,210	4,657,419	4,665,511
4,619,448	4,646,426	4,657,440	4,665,811
4,621,365	4,646,521	4,657,562	4,665,981
4,621,605	4,646,842	4,657,897	4,666,025
4,623,277	4,646,871	4,657,920	4,666,136
4,623,519	4,647,162	4,657,930	4,666,366
4,624,141	4,647,175	4,657,994	4,666,756
4,624,759	4,647,193	4,658,022	4,667,838
4,626,372	4,647,299	4,658,172	4,668,530
4,626,523	4,647,442	4,658,186	4,669,487
4,628,523	4,647,786	4,658,523	4,670,168
4,628,667	4,647,907	4,658,620	4,670,177
4,628,983	4,648,147	4,658,703	4,675,433
4,629,104	4,648,553	4,658,896	4,678,202
4,631,301	4,648,639	4,659,013	

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections are open to public use and each of the Patent Depository Libraries, in addition, offers the publications of the U.S. Patent Classification System (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the Patent Depository Libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 826-4500 Ext. 21
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage Municipal Libraries	(907) 264-4481
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7609
Arkansas	Little Rock: Arkansas State Library	(501) 371-2090
California	Irvine: University of California, Irvine Library	(714) 856-7234
	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale: Patent Information Clearinghouse*	(408) 730-7290
Colorado	Denver Public Library	(303) 571-2122
Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 636-5060
Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
	Miami–Dade Public Library	(305) 375-2665
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
Idaho	Moscow: University of Idaho Library	(208) 885-6235
Illinois	Chicago Public Library	(312) 269-2865
	Springfield: Illinois State Library	(217) 782-5430
Indiana	Indianapolis–Marion County Public Library	(317) 269-1741
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Maryland	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 454-3037
Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library & Information Center	(612) 372-6570
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 390
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4284
Nebraska	Lincoln: University of Nebraska-Lincoln, Engineering Library	(402) 472-3411
Nevada	Reno: University of Nevada Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7815
New Mexico	Albuquerque: University of New Mexico Library	(505) 277-5441
New York	Albany: New York State Library	(518) 474-7040
	Buffalo and Erie County Public Library	(716) 846-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
Ohio	Cincinnati & Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6286
	Toledo/Lucas County Public Library	(419) 255-7055 Ext. 212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 624-6546
Oregon	Salem: Oregon State Library	(503) 378-4239
Pennsylvania	Philadelphia: Free Library	(215) 686-5330
	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 521-8726
South Carolina	Charleston: Medical University of South Carolina Library	(803) 792-2371
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
	Nashville: Vanderbilt University Library	(615) 322-2775
Texas	Austin: McKinney Engineering Library, University of Texas.	(512) 471-1610
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
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Virginia	Richmond: Virginia Commonwealth University Library	(804) 257-1104
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Engineering Library, University of Wisconsin	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

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*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

JAMES E. DENNY, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF July 18, 1987

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	4-10-86
ORGANIC CHEMISTRY AND BIOTECHNOLOGY, GROUP 120—C. E. VAN HORN, Director	2-15-85
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	1-30-86
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	1-23-86
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director	2-18-86
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	7-30-85
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director	9-07-84
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	11-4-85
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	6-26-85
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director	7-10-85
DESIGN, GROUP 290—K. L. CAGE, Director	1-14-85
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	3-12-86
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—S. N. ZAHARNA, Director	10-04-85
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director	10-15-85
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director	1-31-86
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	10-01-86

Expiration of patents: The patents within the range of numbers indicated below expire during July 1987, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,518,701 to 3,522,400, inclusive

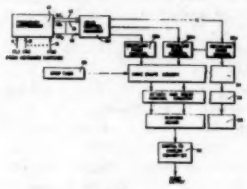
Plant Patents ..... Numbers 2,977 to 2,985 inclusive

REEXAMINATIONS

AUGUST 18, 1987

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 3,515,792 (743rd)
DIGITAL ORGAN
Ralph Deutsch, Sherman Oaks, Calif., assignor to North American Rockwell Corporation
Reexamination Request No. 90/000,761, Apr. 18, 1985.
Reexamination Certificate for Patent No. 3,515,792, issued Jun. 2, 1970, Ser. No. 660,997, Aug. 16, 1967.
Int. Cl.[4] G10H *1/02, 7/00*
U.S. Cl. 84—1.03

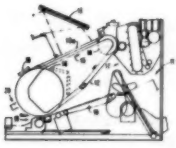


AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–46** are cancelled.

[**39**. Means for storing in digital representation the amplitude of a wave shape at a plurality of spaced points, means responsive to said stored amplitudes for generating a musical note.]

B1 3,647,293 (744th)
COPYING SYSTEM FEATURING COMBINED DEVELOPING-CLEANING STATION ALTERNATELY ACTIVATED
Carl A. Queener, Lexington, Ky., assignor to International Business Machines Corporation, Armonk, N.Y.
Reexamination Request No. 90/000,339, Mar. 9, 1983.
Reexamination Certificate for Patent No. 3,647,293, issued Mar. 7, 1972, Ser. No. 94,037, Dec. 1, 1970.
Int. Cl.[4] G03G *21/00*
U.S. Cl. 355—15



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–6** and **8** are cancelled.

Claim **7** is determined to be patentable as amended.

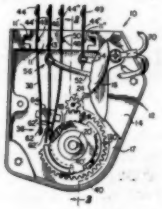
New claims **9–29** are added and determined to be patentable.

[**1**. Electrophotographic apparatus for producing at least one copy from an original document and having the customary electrophotographic facilities for charging, imaging, transferring, precleaning, and erasing a photoconductor medium, said photoconductor medium comprising a movable member having an endless surface, comprising:

a combined developer-cleaner unit positioned for engagement with said photoconductor medium at a single station for developing an image on said photoconductor medium in one mode and cleaning said photoconductor medium in another mode; and

means for selectively activating said developer-cleaner unit in one or the other of said modes during operation of the said apparatus.]

B1 3,727,015 (745th)
CAM OPERATED PROGRAM TIMER ASSEMBLY WITH REPLACEABLE LEAF SPRING CONTACT STRUCTURE
Elmo W. Voland; Harold T. Simmons, and Pauker Kurt, all of Indianapolis, Ind., assignors to P. R. Mallory & Co., Inc., Indianapolis, Ind.
Reexamination Request No. 90/001,100, Sep. 29, 1986.
Reexamination Certificate for Patent No. 3,727,015, issued Apr. 10, 1973, Ser. No. 133,437, Apr. 12, 1971.
Continuation of Ser. No. 731,228, May 22, 1968, abandoned.
Int. Cl.[4] H01H *9/08, 43/10*
U.S. Cl. 200—38 R



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1** and **4–10** is confirmed.

Claim **2** is determined to be patentable as amended.

Claim **3** dependent on an amended claim, is determined to be patentable.

1. In a timer having motor driven cam programming means;

a. a cup shaped housing and a cover closing same, said cam programming means carried within said cup-shaped housing,

b. slots provided across a cut-away portion of a wall of said cup-shaped housing, said cover including a projection adapted to mate said cut-away portion and close said slots.

c. at least two one-piece combination plug-in electrical terminals and movable switch blades carried in said slots, the plug-in electrical terminal portion of said one-piece combination extending through at least a substantial portion of said wall in said slots,

d. projections lanced from said one-piece combination adapted to be received in notches provided in said wall and opening to said slots, said notches having restraining

walls transverse to the lengthwise direction of said one-piece combination preventing any substantial lengthwise slippage of said one-piece combination,

e. said movable switch blades extending substantially lineally beyond the ends of said plug-in electrical terminal portions so as to be cantilevered through the cooperation of said plug-in electrical terminal portion and said wall, said movable switch blades responsive to said cam programming means, and

f. cooperating electrical contacts carried at the free ends of said movable blades.

B1 3,905,809 (746th)
ALLOY FOR MAKING DUCTILE IRON

Andrew B. Malizio, Delran; Martin A. Rice, Florence, both of N.J., and Harry F. Brooks, Levittown, Pa., assignors to United States Pipe and Foundry Company, Birmingham, Ala.

Reexamination Request No. 90/001,157, Jan. 30, 1987.
Reexamination Certificate for Patent No. 3,905,809, issued Sep. 16, 1975, Ser. No. 434,403, Jan. 18, 1974.
Division of Ser. No. 189,670, Oct. 15, 1971, Pat. No. 3,799,767.
Int. Cl.[4] C22C *37/00*
U.S. Cl. 420—578

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1**, **3** and **4** are determined to be patentable as amended.

Claim **2**, dependent on an amended claim, is determined to be patentable.

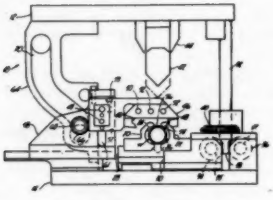
New claims **5–8** are added and determined to be patentable.

1. A nodularizing composition for use in the production of nodular cast iron [comprising] *consisting essentially of* at least two nodularizing elements in a silicon-iron alloy or mixture of silicon-iron alloys, said elements selected from the group consisting of magnesium, cerium, yttrium, lanthanum, neodymium and praseodymium with each being present in the alloy or alloys in an amount of from about 1 to 3 percent by weight of the composition and the total amount of nodularizing elements in the composition not exceeding more than about 12 percent.

B2 4,108,029 (747th)
CUT-OFF DIE SET

Alexander Borzym, Dearborn, Mich., assignor to Alpha Industries, Inc., Dearborn, Mich.

Reexamination Request No. 90/000,682, Dec. 10, 1984.
Reexamination Certificate for Patent No. 4,108,029, issued Aug. 22, 1978, Ser. No. 799,205, May 23, 1977.
Reexamination Certificate B1 4,108,029, issued Jan. 1, 1985.
Int. Cl.[4] B26D *1/56, 3/16*
U.S. Cl. 83—54



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim **4** was previously cancelled.

Claim **12** was previously disclaimed.

Claim **7** and **8** are cancelled.

Claims **1**, **6** and **13** are determined to be patentable as amended.

Claims **2**, **3**, **5**, **9–11** and **14–16**, dependent on an amended claim, are determined to be patentable.

New claim **17** is added and determined to be patentable.

1. A cut-off die set for use in an elongated stock cut-off apparatus of the type including a ram mechanism for operating said cut-off die set, said die set comprising [:] *as an integrated combination which is removable as a unit from said cut-off apparatus:*

an upper die shoe;

a lower die shoe;

guide means interconnecting the upper and lower shoes for reciprocal motion therebetween;

clamping means comprising a pair of clamping jaws on said lower shoe; cam means depending from said upper shoe for directly and positively actuating said jaws as a result of motion of said upper shoe relative to said lower shoe for clamping said die set to said stock;

a main cut-off blade, carried by said upper shoe to sever said stock after said clamping means clamps said die set to said stock;

notching means for notching said stock periphery prior to said severing by said main cut-off blade at the point on said stock at which said severing is initiated said notching means including:

a notching blade, slide means for reciprocally drawing said notching blade from an initial position through a notching stroke across said stock prior to said severing of said stock by said main cut-off blade and returning said notching blade to said initial position through the same path as the notching stroke and normally without change in attitude after said main cut-off blade has severed said stock at said notching point, and *actuating* means mechanically connecting said slide means to said upper shoe for positively driving the slide means only in the notching stroke direction as the upper shoe descends towards said lower shoe for positively driving the slide means only in the return direction as the upper shoe ascends reciprocally away from said lower shoe [.], *said cam means, said slide means and said actuating means, in combination, simultaneously initiating operation of said clamping means, said main cut-off blade and said notching means in response to reciprocation of said upper die shoe toward said lower die shoe by said ram mechanism.*

B1 4,138,543 (748th)
POLYMERIZATION OF ORGANOPOLYSILOXANES

Michel Bargain, Lyons, and Claude Millet, Saint-Priest, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Reexamination Request No. 90/001,079, Sep. 4, 1986.
Reexamination Certificate for Patent No. 4,138,543, issued Feb. 6, 1979, Ser. No. 800,391, May 25, 1977.
Claims priority, application France, May 31, 1976, 76 17170
Int. Cl.[4] C08G *77/04*
U.S. Cl. 528—14

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **4–6** and **9–11** is confirmed.

Claims **1–3**, **7**, **8** and **12–22** are cancelled.

[**1**. A process for the preparation of high molecular weight organopolysiloxanes comprising bulk polymerization of siloxanes which comprise at least 50% by weight of the cyclic siloxanes of the formula:

$$-(R_1R_2Si-O)_n-$$

wherein "n" represents an integer which is at least 4, "R_1" is a hydrocarbon radical containing from 1 to 12 carbon atoms, which may be unsubstituted or substituted by one or more members selected from the group consisting of halogen, amino and cyano, and "R_2" is either the "R_1" radical or —OR_3, wherein "R_3" is either hydrogen or the "R_1" radical, in the presence of:

(a) about 0.005 to about 1 millimol of an alkaline catalyst per 100 g of the siloxane employed; and

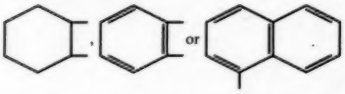
(b) from 0.05 to 5 mols, per mol of alkaline catalyst, of a monocyclic or polycyclic heterocycle compound or mixture of heterocycle compounds, comprising at least 3 heterocycle members selected from the groups —O—, —S—,

or —NH—, and having from 9 to 60 carbon atoms, the heterocycle members being interconnected via hydrocarbon groups comprising at least two carbon atoms.]

4. The process as defined by claim **1**, wherein the component (b) is a monocyclic polythioether of the formula:

$$-(R-S)_a-$$

in which "R" represents (1) a —CH_2—CH_2— or —CH_2—CH_2—CH_2— radical or (2) a radical selected from the group consisting of



radicals, the number of -(R—S)-units in which "R" represents a radical (2) being 1 or 2, and "a" is a number from 3 to 20.

B1 4,157,761 (749th)

DISCHARGER MECHANISM

Harald H. A. Debor, Katevale, Canada, assignor to S. W. Hooper & Company, Ltd., Sherbrooke, Canada

Reexamination Request No. 90/000,605, Aug. 9, 1984.
Reexamination Certificate for Patent No. 4,157,761, issued Jun. 12, 1979, Ser. No. 821,952, Aug. 4, 1977.
Claims priority, application United Kingdom, Feb. 2, 1977, 4210/77
Int. Cl.[4] B65G *65/44*
U.S. Cl. 414—304

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–3** are cancelled.

[**1**. A discharger assembly for positively discharging solid materials from the underside of a pile mounted on a substantially horizontal floor of a hopper or bin, the floor having a discharge location at one end thereof, said assembly comprising at least two discharge mechanisms of substantially the same size mounted on the floor adjacent one another, each discharge mechanism comprising

a single stoker rod extending beneath the pile, one end being a discharge end;

reciprocating means for reciprocating the stoker rod longitudinally, and comprising a stationary hydraulic cylinder mounted on a thrust member which operatively cooperates with said bin or hopper and a moving piston arm connected to one end of the stoker rod;

a plurality of stoker cross bars substantially perpendicular to the stoker rod, equispaced apart and rigidly attached at their centers thereof directly to the stoker rod;

each of the cross bars having a wedge shaped cross section with a vertical surface facing towards the discharge end and an upward sloped surface facing away from the discharge end at an angle less than 45°;

a plurality of fixed floor angles parallel and equispaced, each of the fixed floor angles interspaced and parallel with each of the cross bars such that a central cross bar is reciprocately moved between the floor angles adjacent thereto; and

each floor angle having in cross section an upward steeply sloped face facing toward the discharge end at an angle greater than 45°, and an upward sloped surface facing away from the discharge end at an angle less than 45°, and wherein the single stoker rod rests on bearing blocks located in a trough, and the stoker cross bars rigidly connected directly to the top portion of the stoker rod such that the bottom of said cross bars is located proximate to and just above the floor and trough; and

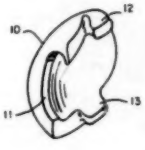
wherein the reciprocating means of the discharge mechanisms are adapted to reciprocate the corresponding stoker rods out of phase with one another.]

B1 4,556,122 (750th)

EAR ACOUSTICAL HEARING AID

Richard L. Goode, Los Altos, Calif., assignor to Innovative Hearing Corporation, San Francisco, Calif.

Reexamination Request No. 90/001,045, Jun. 30, 1986.
Reexamination Certificate for Patent No. 4,556,122, issued Dec. 3, 1985, Ser. No. 557,701, Dec. 2, 1983.
Int. Cl.[4] G10K *11/26*
U.S. Cl. 181—136



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1, 3, 5, 6, 10 and 13 are determined to be patentable as amended.

Claims 2, 4, 7–9, 11, 12 and 14–17 dependent on an amended claim, are determined to be patentable.

New claims 18 and 19 are added and determined to be patentable.

1. An acoustical hearing aid adapted for use in a human ear, comprising:

a *curved hard-walled structure defining a chamber and* having an *outward facing* opening on [its] *a* surface *thereof* to admit sound [and an opening to pass sound] *into said chamber for passage* to the inner ear, [the chamber] *said hard-walled structure* adapted to fit into the *auricle and* concha of the human ear and [comprising] *to enclose a preselected volume of said chamber with the concha for providing* a sound resonator having a bandwidth of several hundred hertz serving to shift a normal resonant frequency of the concha downward; and [chamber] extensions *connected to the hard-wall of the chamber* adapted to hook over the upper and lower aspects of the concha of the ear thus attaching said chamber to the auricle of the ear.

REISSUES

AUGUST 18, 1987

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 32,475

OPTICAL WAVEGUIDE TRANSMITTING LIGHT WAVE ENERGY IN SINGLE MODE

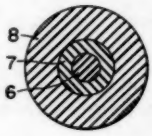
Shigeo Nishida; Shojiro Kawakami, both of Sendai; Yoichi Ohtaka, Mitaka, and Seiichi Onoda, Tokorozawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Original No. 3,997,241, dated Dec. 14, 1976, Ser. No. 619,518, Oct. 3, 1975. Continuation-in-part of Ser. No. 476,310, Jun. 4, 1974, abandoned. Application for reissue Mar. 14, 1985, Ser. No. 711,820

Claims priority, application Japan, Jun. 7, 1973, 48-64533

Int. Cl.[4] G02B *6/22*

U.S. Cl. 350—96.33 **3 Claims**



1. An optical waveguide transmitting light wave energy in a single mode comprising:

a solid body of a first transparent dielectric material having a uniform refractive index n and a circular cross-section having a radius dimension a;

a layer of a second transparent dielectric material formed coaxially on the solid body and having a refractive index qn and a thickness δa;

a layer of a third transparent dielectric material surrounding said layer of the second transparent dielectric material and having a refractive index pn; and

said three transparent dielectric materials having a following relationship:

$$\frac{2.40483}{\sqrt{\frac{1-p^2}{1-q^2}}} - 1 < \frac{2a\pi n}{\lambda}\sqrt{1-q^2} < \frac{3.83171}{\sqrt{\frac{1-p^2}{1-q^2}}} - 1,$$

where μ is an optical wavelength, *p is smaller than 1 and q is smaller than p.*

Re. 32,476

CONSOLIDATION OF AGGREGATE MATERIAL

John F. Kistner, Oakdale, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Original No. 3,805,532, dated Apr. 23, 1974, Ser. No. 190,358, Oct. 18, 1971; Reexamination Certificate B1 3,805,532 dated 1985, Request No. 90/000,598, Jul. 30, 1984. Continuation-in-part of Ser. No. 100,378, Dec. 21, 1970, Pat. No. 4,417,004. Application for reissue Apr. 22, 1986, Ser. No. 855,001

Int. Cl.[4] A01G *9/10*; C08G *18/14*; E02D *3/12*

U.S. Cl. 405—264 **19 Claims**

22. A method for forming potting media comprising mixing aggregate material with a fluid agent comprising a hydrophilic urethane prepolymer having a plurality of oxyethylene units in its polymer backbone and water to form a slurry, the weight ratio of water to prepolymer being at least 1:1 and said prepolymer comprising about 1 to 40 weight percent based on the weight of the aggregate material, pouring said slurry into a mold and allowing said prepolymer to cure to form a porous cellular, cohesive resilient, integral, water-permeable, hydrophilic, flexible, spongy, breathable, cast potting media for supporting plant growth.

24. A resilient, integral, water-permeable, hydrophilic, breathable potting media comprising aggregate material bonded in a water-insoluble, cellular, hydrophilic polyurethane-polyurea polymer matrix, said polymer matrix being the reaction product of a hydrophilic urethane prepolymer having a plurality of oxyethylene units in its polymer backbone and water, the weight ratio of water to prepolymer forming the reaction product being at least 1:1 and the amount of prepolymer used to form the polymer matrix being about 1 to 40 weight percent based on the weight of the aggregate material in the potting media.

Re. 32,477

ICE MELTER AND METHOD OF MAKING SAME

Forrest M. McConnell, Lake Forest, Ill., assignor to Koos, Inc., Kenosha, Wis.

Original No. 4,512,907, dated Apr. 23, 1985, Ser. No. 577,257, Feb. 6, 1984. Application for reissue Oct. 14, 1986, Ser. No. 918,140

Int. Cl.[4] C09K *3/18*

U.S. Cl. 252—70 **5 Claims**

4. An ice melter composition for use on driveways, sidewalks, and the like comprising:

a salt combination and an amide,

said salt combination comprising a soluble mixture of sodium chloride and potassium chloride, of which mixture each said chloride is a substantial component by weight,

said salt combination being in particulate form sized to substantially lie in the range of from about 1.19 millimeters to about 2.36 millimeters,

and said amide comprising urea which is present and coated on the particulate material making up said salt combination in the range of from about 1 percent to about 4 percent by weight of said salt combination.

Re. 32,478

TRANSACTION PROCESSING SYSTEM

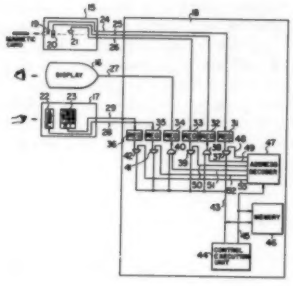
Kanzen Gotou, Owariasahi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Original No. 4,423,318, dated Dec. 27, 1983, Ser. No. 274,862, Jun. 18, 1981. Application for reissue Dec. 27, 1985, Ser. No. 814,745

Claims priority, application Japan, Apr. 24, 1981, 56-61217

Int. Cl.[4] G06F *15/30*

U.S. Cl. 235—379 **16 Claims**



1. A transaction processing system in an automatic transac-

tion machine for automatically carrying out transactions [including] *such as* cash withdrawal, balance checking [and] *or* depositing by [an operation] *at least one operation* of an operator, comprising the steps of:

preparing a plurality of processing procedures for [such] *a* transaction;

[displaying] *indicating* an initial operation direction relating to one of the processing procedures for processing the transaction in accordance with said one processing procedure; and

if an initial operation relating to other processing procedure than [displayed] *indicated* is conducted, proceeding the processing in accordance with said other processing procedure.

Re. 32,479

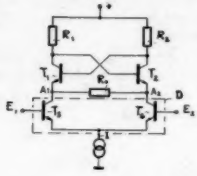
FEEDBACK AMPLIFIER OR THRESHOLD VALUE SWITCH FOR A CURRENT FEED DIFFERENTIAL STAGE

Rolf Böhme, Bad Friedrichshall, Fed. Rep. of Germany, assignor to Telefunken electronic GmbH, Heilbronn, Fed. Rep. of Germany

Original No. 4,418,321, dated Nov. 29, 1983, Ser. No. 296,484, Aug. 26, 1981. Application for reissue Nov. 26, 1985, Ser. No. 801,949

Int. Cl.[4] H03F *3/45*

U.S. Cl. 330—261 **8 Claims**



1. A feedback amplifier including a current-fed differential stage having first and second outputs, said feedback amplifier additionally comprising a first transistor having an emitter connected to the first output of the differential stage; a second transistor having an emitter connected to the second output of the differential stage; a first resistor connected between both the outputs of the differential stage; a source of supply voltage; and second and third resistors comprising operating resistors connected between said supply voltage source and said two transistors, wherein said second resistor is connected to the collector of said first transistor [and the base of said second transistor], [and] said third resistor is connected to the collector of said second transistor [and the base of said first transistor] *said feedback amplifier further including first and second feedback amplifier output means consisting of the collectors of said first and second transistors, respectively.*

Re. 32,480

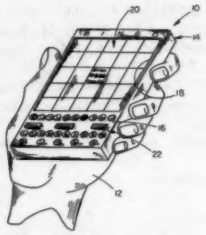
ELECTRONIC BINGO PLAYER

Patrick J. Bolan, 2117 Castelar, Omaha, Nebr. 68108

Original No. 4,475,157, dated Oct. 2, 1984, Ser. No. 323,265, Nov. 20, 1981. Application for reissue May 8, 1986, Ser. No. 861,244

Int. Cl.[4] A63F *3/06*

U.S. Cl. 364—410 **7 Claims**



1. An electronic bingo playing apparatus for keeping track of a plurality of five row/five column conventional bingo cards, said apparatus comprising a hand held portable computer which includes,

a keyboard comprising a plurality of data entry keys and instruction keys,

said data entry keys including ten numerical digit entry keys [and five alphabetic character entry keys corresponding to respective columns of a bingo card],

said instruction keys including a plurality of winning pattern designation keys,

a card memory operative to temporarily store bingo card content data and played number data entered by said data entry keys,

a display operative to display numerical information,

said display comprising a five-by-five matrix including a center display unit and **24** separate numerical display units arranged about said center display unit,

a microprocessor operative to control data flow from said keys to said card memory and display and between said card memory and display, and to perform data manipulations,

and a program memory in which there is stored a software program to direct microprocessor operation,

said microprocessor being operative in a set-up mode under the direction of said software program to store in said card memory the bingo card content data which is entered by said data entry keys, and to record winning pattern information which is entered by said instruction keys, and

said microprocessor being operative in play mode under the direction of said software program to scan the keyboard thereby to read each letter/number combination which is entered by said data entry keys, to scan the card memory to identify any matches between the last entered letter/-number combination and the stored card content data therein, to accumulate said matches and to signal whether any winning patterns of accumulated matches have been achieved,

said data entry keys and instruction keys thereby being capable of entering all of the input information in both the setup and play modes of the microprocessor.

PATENTS

GRANTED AUG. 18, 1987

ERRATA

For CLASS	See PATENT NO.
437-034	4,686,758
437-005	4,686,760
437-005	4,686,761
437-051	4,686,763
277-012	4,687,127
249-053	4,687,178
439-092	4,687,264
439-068	4,687,265
439-077	4,687,266
439-062	4,687,267
439-161	4,687,269
439-035	4,687,270
439-035	4,687,271
439-271	4,687,272
439-411	4,687,273
439-426	4,687,274
439-404	4,687,275
439-557	4,687,276
439-621	4,687,277
439-842	4,687,278
439-578	4,687,279
439-874	4,687,280
414-049	4,687,417
434-719	4,687,445
010-003	4,687,501
512-027	4,687,599
124-038	4,687,661
437-238	4,687,682
427-054	4,687,825
427-340	4,687,827
503-204	4,688,057
503-209	4,688,058
503-220	4,688,059
503-214	4,688,060
380-015	4,688,097
362-021	4,688,159
380-048	4,688,257

PATENTS

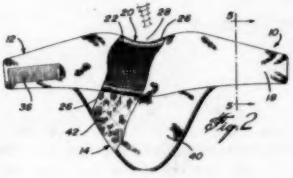
GRANTED AUGUST 18, 1987

GENERAL AND MECHANICAL

4,686,710
SPORTS NECK PROTECTOR

Stephen Marston, 6980 Cote St.Luc Rd., Apt. 502, Montreal, Quebec, Canada H4V 3A4, and Isaac Aboud, 25 Brittany, Town of Mount Royal, Quebec, Canada H3P 1A2

Filed Sep. 11, 1986, Ser. No. 906,036
Claims priority, application Canada, Dec. 17, 1985, 497816
Int. Cl.[4] A41D *13/00*
U.S. Cl. 2—2 **12 Claims**



1. A neck protector for protecting a wearer's throat area against lacerations, comprising an elongated, substantially flat armour member adapted to be positioned about the neck of a wearer and shaped to at least cover vital areas of the wearer's throat, said armour member being made of a flexible slash-resistant material having a slash-resistance of at least about 120 lbs, and means fixed to said armour member for enabling said member to retain a protective shape over said vital throat areas.

4,686,711
EYE PROTECTION DEVICE FOR WELDER PROTECTION EQUIPMENT

Hermann Budmiger, Seewen, Switzerland, assignor to Impexor AG, Basel, Switzerland

Continuation of Ser. No. 652,336, Sep. 19, 1984, abandoned. This application Aug. 11, 1986, Ser. No. 895,511
Claims priority, application Switzerland, Sep. 21, 1983, 5 124/83
Int. Cl.[4] A61F *9/06*
U.S. Cl. 2—8 **4 Claims**

1. An eye protection device for the window of a welding hood or shield comprising:

a protection filter being selectively operable to screen eye-impairable welding radiation,

said filter including a movable screen;

means for shifting said screen toward and away from a position adjacent said window,

said drive means including a driven revolving device and an entrainer coupled to said revolving device and engaging said protective screen; and

a control operably coupled to said drive means,

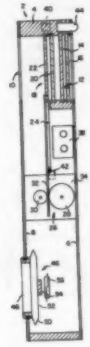
said control having an electro-optical sensor being responsive to said radiation to actuate said drive means for shifting said screen toward said position adjacent said window whenever radiation is detected,

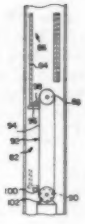
said control also having a manually operable override switch for selective actuation of said drive means normally before the commencement of a welding operation,

said manually operable switch comprising a pneumatic sensor operably responsive to a blown air stream,

said control further including structure for retaining said screen in said window-adjacent position whenever said radiation is detected by said sensor regardless of whether said manually operable switch is actuated,

said control including a timing element operable to actuate said drive means for shifting said screen away from said window adjacent position whenever said electro-optical sensor fails to detect welding radiation during a certain time interval,





said manually operable switch including structure for manual overriding of said timing element for selective shifting of said screen away from said window adjacent position before elapse of said certain time interval.

4,686,712
GOGGLE MOUNTING SYSTEM

Lowell E. Spiva, 5778 Firebird Ct., Camarillo, Calif. 93010

Filed Sep. 11, 1986, Ser. No. 906,288
Int. Cl.[4] A61F *9/00*; A42B *1/04*
U.S. Cl. 2—10 **23 Claims**

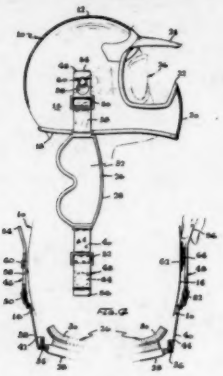
1. A goggle mounting system comprising:

first and second tabs;

said first tab having means thereon for attachment to the first strap of a two strap goggle and having separate means thereon for pivotal attachment to one side of a helmet, said attachment means enabling detachment of the first tab from the helmet but preventing detachment of the first tab when the first tab is pulled outward away from the helmet;

said second tab having means thereon for attachment to the opposite strap of the two strap goggle from the strap to which said first tab is attached, said second tab also having means thereon for non-pivotable attachment to an opposite side of a helmet, the attachment means for the second

tab being positionally adjustable along the helmet for adjusting the tension on the goggle straps, and detachable



from the helmet by an outward pull away from the helmet.

4,686,713

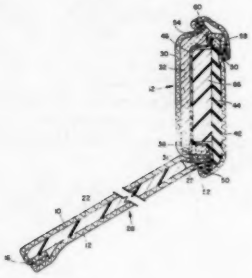
VISOR AND ASSEMBLY METHOD FOR VISOR

Ann C. Coleman, and Irene E. Garza, both of San Antonio, Tex., assignors to Texace Corporation, San Antonio, Tex.

Continuation of Ser. No. 692,824, Jan. 18, 1985, abandoned. This application Nov. 26, 1986, Ser. No. 935,124

Int. Cl.[4] A61F *9/04*

U.S. Cl. 2—12 **12 Claims**



1. A method of assembling a visor which does not compltely encircle the head of the person wearing the visor comprising:

joining crescent-shaped pieces of fabric to form a pocket;

inserting a crescent-shaped sheet of plastic into the pocket to form a bill;

stitching an elongated strip of wadding to an elongated strip of cloth along a first edge thereof to form a front piece;

stitching the front piece to the bill along a seam along the first edge of the elongate strip of cloth;

stitching a first edge of an elongate sweat band to the front piece along the first edge of the elongate strip of cloth;

stitching a second edge of the sweat band to a second edge of the elongate strip of cloth;

stitching an overlap piece to the front piece and the sweat band along the second edge thereof;

inserting a semi-rigid headband into the sweat band; and

stitching the ends of the overlap piece and the front piece closed.

4,686,714

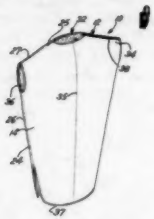
REVERSIBLE DRESS

Vida A. Harley, 409 E. Haney, South Bend, Ind. 46613

Filed Apr. 17, 1985, Ser. No. 724,064

Int. Cl.[4] A41D *1/22;* **A41B** *9/00*

U.S. Cl. 2—105 **2 Claims**



1. A dress comprising first and second fabric sheets, each sheet having a front face and a rear face, said sheets positioned in a rear to rear face relationship to form common top and bottom edges and two common vertical end edges, each sheet including a shoulder portion extending forwardly of its said front face, each shoulder portion including an arm opening, said shoulder portions being separated to form a central opening means between said sheets for accommodating the head and neck of a wearer, said sheets joined at one said common end edges and said top edges, said sheets joined adjacent each side of said central opening means from said top edges to said bottom edges, said dress having a first style wherein said first sheet front face is exposed at the front and rear of the wearer and a second style wherein said second sheet front face is exposed at the front and rear of the wearer and a third style wherein a portion of each sheet front face is exposed at the front and rear of the wearer, first connectable closure means attached to each sheet end edge for securing said dress in a selected one of its said three styles, and second connectable closure mens attached to said sheet top edge for securing said dress in a selected one of its first and second styles.

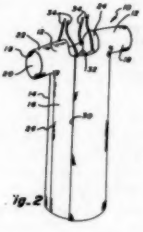
4,686,715

PATIENT GOWN

Sandra N. Price, 6277 S. Locust St., Englewood, Colo. 80110

Filed Sep. 26, 1986, Ser. No. 911,957

Int. Cl.[4] A41D *9/00*

U.S. Cl. 2—114 **9 Claims**

1. A two piece gown for use by medical patients comprising in combination:

two disconnected substantially identical segments of fabric with each segment having a front panel, a back panel, an arm hole, a neck opening, and fastener means for extension across the user's shoulder which is on the opposite side from the arm hole and whereby when one segment is put on the user by inserting one arm through the arm hole and attaching the fastener means across the opposite

shoulder, and the other segment is put on the user in the same manner but on the opposite side of the body, the front and back panels of one segment will overlap respectively the front and back panels of the other segment.

4,686,716

NECKTIE HOLDER

David R. Burns, 9000 Zuni SE., Albuquerque, N. Mex. 87123

Filed Dec. 19, 1985, Ser. No. 810,496
Int. Cl.[4] A41D *25/08*
U.S. Cl. 2—152 R 2 Claims

1. An article of manufacture in combination with a shirt and necktie, the shirt having buttons connected by threads and the necktie having an exposed wider portion and a hidden narrower portion comprising:

(a) an elongated flexible member folded in its central area to define a first loop, a second open loop, and an elongated doubled section between the said loops,

(b) a clip secured to each respective end of said flexible member to close the second loop, and

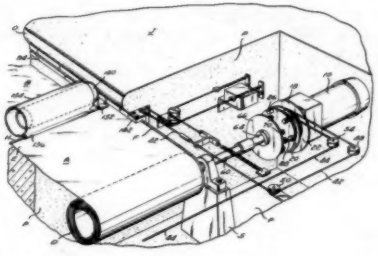
(c) a pair of sleeves embracing the said elongated doubled section between the said loops and slidable thereon to vary the radii of said loops, whereby in use the said first loop is secured to shirt button threads, the said second loop embraces the necktie hidden narrower portion, and the said clip seizes a rearward segment of the necktie exposed wider portion.

4,686,717

POOL COVER EXTENDING AND RETRACTING DEVICE

Scott H. MacDonald, 3736 Inglewood Blvd., #9, and William E. MacDonald, 3455 Stoner Ave., both of Los Angeles, Calif. 90066

Continuation of Ser. No. 615,934, May 31, 1984, abandoned.
This application Mar. 31, 1986, Ser. No. 846,127
Int. Cl.[4] E04H *3/18*
U.S. Cl. 4—502 17 Claims



1. A device for enabling a cover to be extended over a pool from retracted pool-uncovering position, for covering the pool, and for enabling the cover to be retracted from extended pool-covering position for uncovering the pool, as desired by the user, comprising:

(a) means which are rotatable and translatable so as to extend the cover from its retracted pool-uncovering position, for covering the pool;

(b) means which are rotatable so as to retract the cover from its extended pool-covering position, for uncovering the pool;

(c) means for rotatably driving the cover extending means and the cover retracting means; and

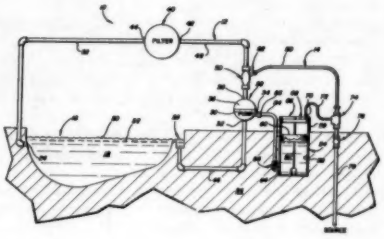
(d) means which are rotatable, for coupling and uncoupling the cover driving means and the cover extending means or the cover retracting means, adapted upon coupling with the cover retracting means to enable the cover to be retracted from its pool-covering position for uncovering the pool, and upon coupling with the cover extending means to enable the cover to be extended from its pool-uncovering position for covering the pool, comprising a rotatable floppy clutch mechanism, adapted, upon rotation thereof, dependent upon the direction of rotation of the cover driving means, and responsive to the force of gravity thereon, to engage the cover driving means for coupling with the cover extending means, or to engage the cover retracting means for coupling therewith.

4,686,718

METHOD AND APPARATUS FOR AUTOMATICALLY MAINTAINING A PREDETERMINED DESIRED LEVEL OF WATER IN A SWIMMING POOL, AND THE LIKE

Clifford W. Kinkead, Phoenix, and David W. Kinkead, Glendale, both of Ariz., assignors to Aqua Systems, Inc., Phoenix, Ariz.

Filed Mar. 25, 1985, Ser. No. 715,383
Int. Cl.[4] F16K *1/18*
U.S. Cl. 4—508 12 Claims



1. A method of automatically adjusting the level of water in a swimming pool to maintain at least a predetermined desired water level comprising the steps of:

periodically circulating the pool water between the pool outlet and the pool inlet;

locating a float chamber at least partially below the pool water level such that the position of a float within the chamber is indicative of the pool water level;

siphoning pool water to a level above the pool water level when the circulation stops for filling the float chamber to position the float at a level indicative of the actual pool water level;

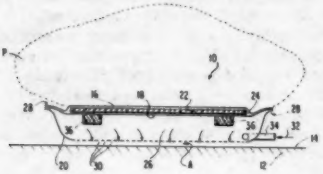
adding fresh water under pressure to the pool whenever the float position indicates that the pool water level has fallen at least a predetermined distance below the predetermined desired level; and

terminating the addition of fresh water under pressure to the pool whenever the float position indicates that the pool water level has risen to said predeterimined desired level.

4,686,719
SEMI-RIGID AIR PALLET TYPE PATIENT MOVER

Raynor A. Johnson, Newark, Del., and Jack Wegener, Preston, Md., assignors to American Industrial Research, Inc., Newark, Del.

Continuation-in-part of Ser. No. 612,836, May 22, 1984, Pat. No. 4,528,704. This application May 30, 1985, Ser. No. 734,112
Int. Cl.[4] B65G 7/06; A61G 7/06, 7/10
U.S. Cl. 5—81 R 9 Claims



1. An air pallet type patient mover for frictionless movement of a patient over a relatively fixed support surface, said patient mover comprising:

top, intermediate and bottom thin flexible sheets,

means for sealing given sheets together linearly to define a plenum chamber between said intermediate and bottom sheets and a backing member cavity between the top sheet and said intermediate sheet,

said bottom thin flexible sheet including a portion defined by the footprint of the load having a plurality of closely spaced small diameter pin hole type perforations opening directly into the plenum chamber and directly onto said support surface,

air inlet means communicating with said plenum chamber at one end thereof for permitting low pressure air pressurization of the plenum chamber for initially jacking of the load and for subsequent discharge through the perforations to create a thin air film between the bottom thin flexible sheet and the support surface,

a semi-rigid backing member within said backing member cavity supporting said load and extending generally the length of said patient mover,

means for dispersion of air throughout said plenum chamber when the air pallet is under load during air pressurization of said plenum chamber,

the improvement wherein said air dispersion means comprises a pair of parallel foam strips within one of said plenum chamber and said backing chamber cavity, laterally spaced and extending over a substantial longitudinal extent of said plenum chamber so as to insure air distribution through said plenum chamber under conditions where the patient is wider over at least a portion of his body than the generally rigid backing member and the plenum chamber, and wherein under load, the patient tends to compress the foam strips, causing the generally rigid backing member to flex about the patient to cradle said patient at least prior to full pressurization of said plenum chamber and creation of the air bearing.

4,686,720
COVERED HAMMOCK

Kathryn H. Newell, 119 A Pine St., Carrboro, N.C. 27510

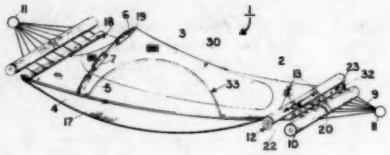
Filed Jan. 4, 1985, Ser. No. 688,974
Int. Cl.[4] A45F 3/22
U.S. Cl. 5—121 7 Claims

1. A hammock having a wide and a narrow end comprising:

(a) a lower support;

(b) an arch member, said arch member positioned laterally across said lower support and spaced inwardly from the wide end; and

(c) an upper cover said upper cover having a lateral inverted u-shaped zipper entrance, said entrance beginning at said lower support and extending upwardly through said upper cover, said upper cover attached at one end to said arch member and extending obliquely downward therefrom to attachment with said lower support at the other end, said upper cover consisting of a non-woven top

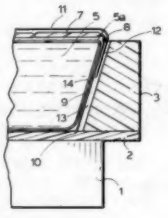


portion and a waterproof bottom portion, said top portion extending laterally across said upper cover to provide minimum visual impairment to an occupant within the hammock, and said bottom portion providing a rain barrier around the lower edge of said top portion.

4,686,721
WATERBED

Nicola P. Hubert, Fischbachtal, Fed. Rep. of Germany, assignor to Halcyon Waterbed Inc., Toronto, Canada

Filed Mar. 26, 1986, Ser. No. 844,308
Claims priority, application Fed. Rep. of Germany, Mar. 27, 1985, 8509304[U]
Int. Cl.[4] A47C 27/08; A47G 9/00
U.S. Cl. 5—451 5 Claims



1. A waterbed comprising:

deformable fliud filled envelope means enclosing fluid therein,

deformable fluid retaining safety liner means receiving the envelope means therein,

bottom support means,

resiliently deformable frame means defining a central recess therein above the bottom support means peripherally bordered by peripheral interior walls,

the envelope means received within the recess supported by the bottom support means and said interior walls with the safety liner means about the envelope means sandwiched between the envelope means and bottom support means and interior walls,

flexible mat means having a top portion overlying the envelope means with edge protions of the mat means extending downwardly from the top portion between said interior walls and said safety liner means, the lower edges of the edge portions coupled to the bottom support means about the periphery of the safety liner means, and

the top portion of the mat means being removably couple to edge portions of the mat means at accessible locations.

4,686,722

ARTICULATED BED WITH CELLULAR AIR CUSHION MATTRESS

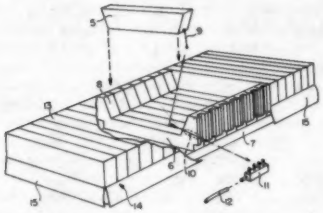
Maarten E. Swart, Delft, Netherlands, assignor to Revalidatie Institut Muiderpoort, Amsterdam, Netherlands

Filed Apr. 4, 1984, Ser. No. 596,805

Claims priority, application Netherlands, Apr. 6, 1983, 8301197

Int. Cl.[4] A47C *27/08, 27/10*

U.S. Cl. 5—453 **7 Claims**



1. A bed comprising a base plate and a plurality of inflatable cushions supported transversely on said base plate along the length of the bed and cumulatively defining the body-supporting surface of the bed, said cushions being impervious to the passage of gas therethrough; and

means for maintaining gas under pressure internally of said cushions, said means comprising:

a gas pressure feed source;

a common feed duct connected to said feed source;

a plurality of branch ducts connected to said common feed duct and connected to distribute gas from said common feed duct to said inflatable cushions;

a first on/off valve in each of said branch ducts whereby different ones of said cushions may be maintained at different pressures by isolating at least some of said branch ducts from each other;

a pressure reducing valve in said common feed duct for controlling the pressure of gas supplied by said feed source to said branch ducts;

a second on/off valve in said common feed duct upstream of said branch ducts for exhausting gas, when open, from those cushions connected to branch ducts whose first on/off valves are also open and, when closed, for providing a supply of pressurized gas through said pressure reducing valve to the branch ducts and to those cushions whose first on/off valves are also open; and

a pressure sensor in said common feed duct.

4,686,723

SEMI-FLUIDIZED BED

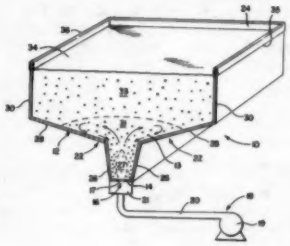
James W. Smith, Toronto, Canada, assignor to The University of Toronto Innovations Foundation, Toronto, Canada

Filed Nov. 14, 1985, Ser. No. 799,839

Int. Cl.[4] A61G *7/04*

U.S. Cl. 5—453 **11 Claims**

1. A patient support bed comprising a generally rectangular base configured to contain a body of particulate material having a floor, said floor having at least one elongate slit extending parallel to the longitudinal axis of said floor and connectable to an air supply, and a pair of inclined surfaces extending upwardly on opposite sides of said slit whereby supply of air to said slit causes circulation of said particulate material along



said inclined surfaces toward said slit and fluidisation of the upper region of said body.

4,686,724

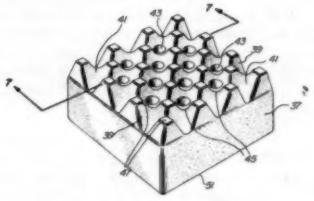
SUPPORT PAD FOR NONAMBULATORY PERSONS

Peter H. Bedford, 21582 Kanakoa La., Huntington Beach, Calif. 92646

Continuation-in-part of Ser. No. 752,451, Jul. 5, 1985, abandoned, which is a continuation of Ser. No. 584,458, Feb. 28, 1984, abandoned, which is a continuation-in-part of Ser. No. 487,582, Apr. 22, 1983, abandoned. This application Feb. 11, 1986, Ser. No. 828,286

Int. Cl.[4] A47C *27/14;* A61G *7/00*

U.S. Cl. 5—468 **4 Claims**



1. A pad for nonambulatory persons, said pad having a foam body with a first and second major side for supporting a human anatomy, the improvement in the pad comprising:

a thickness, as measured by the distance between the first and second major side, being about 3¼ inches;

a substantially uniform distribution of hills of substantially uniform height and cross-section on the first major side of said foam body, said hills being separated by valleys of a substantially uniform 1 inch depth and a uniform cross-section, each of said hills having a flat top, each of the flat tops on each of said hills being at least ½ inches in diameter and being no larger than 1¼ inches in diameter, each of said valleys having an airflow channel terminating at the valley floor and extending through the foam body to the second major side, a plurality of plugs, in a plurality of airflow channels in a manner that permits ready and selective removal of each plug;

the second major side being flat;

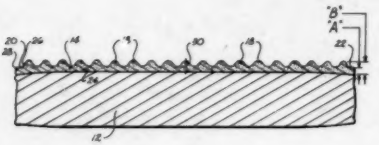
whereby the tops of the hills support a human anatomy with even weight distribution and reduced pressure contact in addition to maximizing air circulation to the parts of the human anatomy in contact with the pad.

4,686,725

MATTRESS CUSHION WITH SECUREMENT FEATURE

Charles B. Mitchell, Greenville, S.C., assignor to Span America Medical Systems, Greenville, S.C.

Filed Oct. 28, 1985, Ser. No. 792,573
Int. Cl.[4] A47C 27/14
U.S. Cl. 5—481 3 Claims



1. A polymeric supplemental support cushion for use between a mattress and a sheet for the mattress, comprising:

a base having a first predetermined thickness, said base being of resilient material,

a bottom surface of said base being flat for placement on a mattress,

an upper support surface integral with said base and extending a predetermined distance thereabove, said upper support surface including a plurality of rows of sinusoidal curved resilient projections covering substantially the entire upper surface of said support cushion,

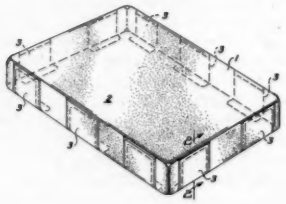
a planar ledge provided on opposite longitudinal sides of said support cushion, each of said planar ledges extending from a respective outer periphery of said support cushion and terminating at the base of an outer row of said sinusoidal curved projections, said ledges being located about halfway between said bottom surface of said base and the peaks of said sinusoidal curved projection, so that when a sheet is placed on said support cushion, it extends from the peaks of said sinusoidal projections of said outer rows of said projections over said planar ledges then down along the side of said mattress whereby upward forces adjacent the edges of said support cushion are minimized enabling said sheet to be properly retained on said mattress.

4,686,726

WATERBED SHEET AND INSERT MEANS THEREFOR

David C. Dunfee, 11011 N. 47th Dr., Glendale, Ariz. 85304

Filed Jun. 4, 1986, Ser. No. 870,726
Int. Cl.[4] A47G 9/00, 9/02
U.S. Cl. 5—485 13 Claims



1. A waterbed mattress-covering sheet assembly for protectively covering at least the sleeping surface of a waterbed mattress, said waterbed mattress having an upper horizontal sleeping surface, a lower horizontal surface adapted to be disposed on a waterbed frame, said waterbed frame having a bottom for supporting the weight of the water-filled mattress and frame sides for limiting the outward bulge of the side portions of the waterbed mattress at least when loaded, and peripheral side portions connecting the upper and lower horizontal surfaces, said peripheral side portions bulging outward from the center of the waterbed mattress in response to the weight of the water contained therein and any load placed thereon, said waterbed sheet assembly comprising, in combination:

a waterbed sheet of relatively flexible fabric material dimensioned to at least cover said upper sleeping surface of said waterbed mattress;

a plurality of pocket-forming flap means operatively disposed at predetermined spaced intervals about the edges of the waterbed sheet adjacent the peripheral edges of the upper sleeping surface of the waterbed mattress and depending downwardly therefrom, said flap means including means for forming pockets, each of said pockets including an upper open end portion, a bottom closed end portion, and an intermediate sheathlike hollow pocket portion integrally disposed therebetween, the upper end portion of each of said pockets being at least one of integral with and attached to said waterbed sheet; and

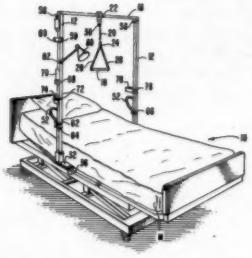
insert means having an upper end portion, a generally planar intermediate portion, and a lower end portion curved outwardly away from the plane of said intermediate portion, each of said insert means being slideably received within one of said pockets such that said curved lower end portion is forced under the outer peripheral edge of the lower horizontal surface of the waterbed mattress and anchored in that position by the weight of the water contained within the waterbed mattress, and wherein said intermediate portion is clampably retained against a side of said waterbed frame by the outward bulge in the sides of the waterbed mattress caused by said weight, said anchored end portion and said clamped intermediate portion of said inserts sheathed within said pockets maintaining said waterbed sheet stretched tantly over said upper sleeping surface, without wrinkles, folds, creases, bunching up, and slippage of the sheet from the tucked position.

4,686,727

CONVENIENCE BAR ASSEMBLY FOR HOSPITAL BED

Lawrence H. Wilkinson, 718 Encino N.E., Albuquerque, N. Mex. 87102, assignor to Lawrence H. Wilkinson, Albuquerque, N. Mex.

Filed Jun. 3, 1985, Ser. No. 740,423
Int. Cl.[4] A47C 21/00
U.S. Cl. 5—503 16 Claims



1. In combination, a convenience bar assembly and a hospital bed comprising:

(a) a generally U-shaped member including two arms oriented in a generally vertical orientation and a horizontal cross-member connecting the arms, the arms being adapted for mounting thereon a plurality of attachments for a patient's use;

(b) means for attaching the lowermost ends of the arms of the U-shaped member to an adjustable hospital bed adjacent opposite sides of the bed so that the horizontal member is oriented transversely over the bed, the adjustable bed including a raisable portion and a floor-engaging

portion, the arms of the U-shaped member being attached to a portion of the raisable portion of the bed which remains stationary with respect to a patient during adjustment of the bed, the attaching means being spaced apart from head and foot portions of the bed, the attaching means being selectively pivotable for selectively pivoting the U-shaped member towards the head portion of the bed without laterally displacing the arms of the U-shaped member with respect to the bed to permit unrestricted access to a patient in the bed;

(c) a horizontal support bar; and

(d) means for swingably connecting the horizontal support bar to the horizontal cross-member so that the horizontal support bar hangs below the horizontal cross-member when the horizontal support bar is at rest.

4,686,728

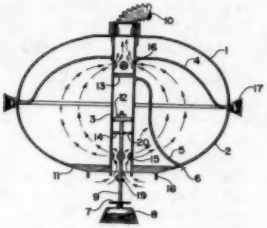
AUTOMATIC SWIMMING POOL CLEANER

David J. Rawlins, 106 Hedy La., Davis, Calif. 95616

Filed Mar. 1, 1985, Ser. No. 707,245

Int. Cl.[4] E04H *3/20*

U.S. Cl. 15—1.7 **6 Claims**



1. An apparatus for cleaning debris from a swimming pool which comprises:

(a) a variable buoyancy vessel adapted to hold changeable masses of air and water;

(b) a centrally disposed vertical tube having a lower port and an upper port, the upper port being adapted for connection to a vacuum hose from the swimming pool, and the lower port communicating to the pool water;

(c) a piston chamber disposed within said tube;

(d) a piston rod extending downwardly from with the said piston chamber to outside the chamber, and having;

(e) a piston mounted at one end of said rod within said piston chamber and a brush at the opposite end of said piston rod, disposed external of said vessel;

(f) door means for closing off said tube disposed intermediate said brush and said piston on said shaft, and external to said vessel;

(g) an adjustable diaphragm within said vessel adapted to segregate said vessel into an air containing first section and a water containing second section;

(h) means, which includes said piston chamber, piston and door, for both enlarging the air mass within the air section while reducing the water mass to give the apparatus buoyancy and motion; and means, which includes said piston chamber, piston and door, for reducing the air mass and enlarging the water mass to permit ingress of pool water and debris through the vessel and out the upper port, wherein the inherent weight of the vessel upon its impact on the bottom of the pool bears down upon the door means to thereby commence closing of the door means; subsequent to which door means closing the said vessel's mass of air changes increasingly and the mass of water changes decreasingly and the said piston descends until such time as it impacts the door means causing the door means to open and water to flood in, thereby again changing the mass of both air and water in the vessel causing the vessel to sink until the door means hits bottom again.

4,686,729

WASHING BRUSH WITH WATER SUPPLY AND ROTATING BRISTLES ESPECIALLY FOR MOTOR VEHICLES

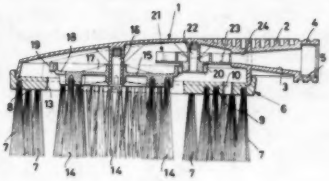
Gianfranco Roman, Pasiano; Claudio Da Rold, and Oliviano Spadotto, both of Pordenone, all of Italy, assignors to Claber S.p.A., Fiume Veneto, Italy

Filed Jan. 28, 1986, Ser. No. 823,292

Claims priority, application Italy, May 23, 1985, 21929/85[U]

Int. Cl.[4] A46B *13/06*

U.S. Cl. 15—29 **1 Claim**



1. Washing brush, especially for a surface of a motor vehicle to be washed by an operator, comprising:

a main body in half-shell form carrying a plate on an underside of the main body and having a handle provided with a longitudinal channel means for providing a water supply therethrough, said plate having a round central hole therein, said main body having a front end and a rear end;

central support plate means, carried in a rotating manner by the main body, for rotating bristles thereon, said rotating bristles protruding through the round central hole in the plate on the underside of the main body;

turbine impeller means, arranged in the main body, for receiving the water supply from the longitudinal channel means;

a motion reducing gear unit, connected in a dynamic manner with the turbine impeller means and the central support plate means, said motion reducing gear unit including a minor gear arranged integrally and coaxially with the turbine impeller means and also including a major gear formed as a ring gear surrounding the central support plate means in contact with the minor gear;

an annular plurality of bristles fixed to the plate carried on the underside of the main body and placed around the ring gear surrounding the central support plate means carrying the rotating bristles, said annular plurality of bristles having zones of greater extension at the front end and the rear end of the main body; and

a circumferential plurality of open window means, arranged in the central support plate means in a circle outside of the rotating bristles but inside the ring gear, for conveying the water supply from the turbine impeller means to the surface of the motor vehicle to be washed;

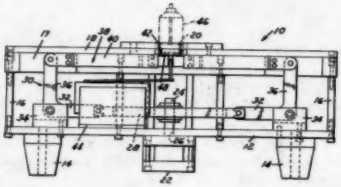
whereby the underside of the main body provides a containment effect for the water supply so that washing action is enhanced while bothersome water sprays toward the operator are prevented.

4,686,730

SEMI-AUTOMATIC ARMATURE ASSEMBLY SLOT CLEANER

William M. Prendergast, Salem, N.H., and Daniel J. Margolien, Winchester, Mass., assignors to Ex-Cell-O Corporation, Walled Lake, Mich.

Filed Jul. 3, 1986, Ser. No. 882,055
Int. Cl.[4] B23P *23/00*
U.S. Cl. 15—93 R 11 Claims



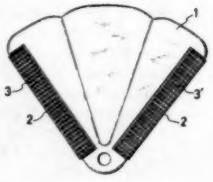
1. A cleaning apparatus for cleaning the radial slots of an armature assembly, said cleaning apparatus comprising a base member, cylinder means mounted on said base member and having reciprocally mounted cylinder rod means extending therefrom, a plurality of blades in radial alignment with said radial slots, and linkage means operatively connected between said blades and said cylinder rod means for causing said blades to move through said respective slots upon energization of said cylinder means to loosen and clear out any chips and burrs in the slots.

4,686,731

FABRIC CURRYCOMB

Nobuhiko Suzuki, 2114-18, Tomitsuka-cho, Hamamatsu City, Shizuoka Prefecture, Japan

Filed Jul. 23, 1984, Ser. No. 633,658
Int. Cl.[4] A47L *25/08*
U.S. Cl. 15—104 A 1 Claim



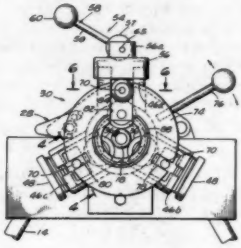
1. A fabric currycomb comprising a substantially flat handle base plate having a plurality of straight edges representing sides of a geometrical figure and having grooves defined in opposite surfaces thereof adjacent to said straight edges and extending substantially parallel thereto; and a plurality of abrasive net strips of different abrasive capabilities supported on said straight edges, respectively, and having a multiplicity of small projections in a file pattern, and each of said net strips being folded into a substantially U or V cross-sectional shape and having free marginal edges bent and inserted into said groove adjacent to one of said straight edges.

4,686,732

WASTE LINE CLEANOUT APPARATUS

Lawrence F. Irwin, 12860 San Fernando Rd., Sylmar, Calif. 91342

Continuation-in-part of Ser. No. 571,181, Jan. 19, 1984, Pat. No. 4,580,306. This application Jan. 6, 1986, Ser. No. 816,328
Int. Cl.[4] B08B *9/02*
U.S. Cl. 15—104.3 SN 8 Claims



1. A feed control device for use with plumbing tools of the type having an elongated coiled spring, or plumbers' snake, and means for rotating the snake about its longitudinal axis, comprising:

(a) two circumferentially spaced roller assemblies, each said assembly comprising a roller and a body portion adapted to rotatably carry said roller;

(b) coiled spring engaging means for pressural engagement with said coiled spring to urge said coiled spring into driving engagement with said rollers, said coiled spring engaging means comprising a coiled spring engaging member movable from a first position wherein said member is not in pressural engagement with said coiled spring to a second position wherein said member is in pressural engagement with said coiled spring; and

(c) carrying means for carrying said roller assemblies and said coiled spring engaging means, said means having a central aperture for receiving said coiled spring and comprising three casings circumfmerentially spaced apart about said snake for carrying said roller assemblies and said coiled spring engaging means, one of said casings having a longitudinally extending slot communicating with said central aperture and having a width greater than the diameter of said coiled spring; and

(d) actuating means for moving said coiled spring engaging member into pressural engagement with said coiled spring.

4,686,733

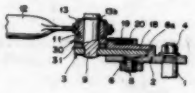
RETRACTABLE TYPE WIPER APPARATUS

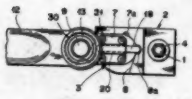
Hideshi Sahara, 1-96 Kitahara, Takashi-cho, Toyohashi-shi, Aichi-ken, Japan

Filed Apr. 16, 1986, Ser. No. 852,527
Claims priority, application Japan, Apr. 20, 1985, 60-84786
Int. Cl.[4] B60S *1/22, 1/24*
U.S. Cl. 15—250.16 1 Claim

1. A retractable type wiper apparatus comprising a first crank connected to an output shaft of a reducer of a wiper motor; a second crank rotatably secured to the first crank by means of a first pivot shaft and so arranged that the second crank is kept bent at a predetermined angle relative to the first crank during the rotation of the first crank in the forward direction, and kept extended substantially straight relative to the first crank during the rotation of the first crank in the reverse direction; a detent slidably mounted in the second crank and adapted to be resiliently urged into a first recess and a second recess in the first crank to thereby lock the second crank in place when the second crank is positioned at the predetermined angled and at the straight extended position,

respectively relative to the first crank; link means rotatably connected to the second crank by means of a second pivot shaft for transmitting the motion of the second crank to a wiper blade; and cam means rotatably mounted over the second pivot shaft and adapted to press and lock said detent as it is urged into either said first or second recess; characterized in that said cam comprises two superposed cam members both engageable





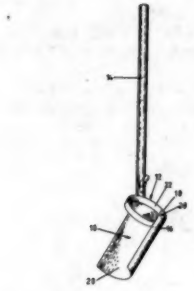
with said detent, one of the cam members being connected integrally with said link means and the other of the cam members being adapted to be moved together with the one cam member with a limited range of lost motion so that the two cam members are maintained at such angles relative to each other that they cooperate to press and lock said detent during the rotation of said first crank in the forward direction.

4,686,734

SPILL INHIBITING DUST PAN

Alexander Kahan, a.k.a. Charles Alexander, P.O. Box 30722, Oakland, Calif. 94604

Filed Nov. 8, 1985, Ser. No. 796,161
Int. Cl.[4] A47L *13/52*
U.S. Cl. 15—257.1 **8 Claims**



1. A dust pan or the like for collecting movable materials from a surface to be cleaned, said dust pan comprising;

(a) a rigid member, said rigid member having a body portion including a planar cross-section and an outer peripheral surface, said outer peripheral surface having at least a portion thereof establishing a convex surface substantially perpendicular to said planar cross-section,

(b) a handle member fixed to said body portion of said rigid member at one edge thereof,

(c) a flexible member, said flexible member having a fixed end and a free end, said fixed end of said flexible member being fixed to said outer portion of said peripheral surface of said rigid member and said free end of said flexible member extending away from said rigid member at the edge of said rigid member opposite said fixed connection of said handle member to said one edge of said body portion, said flexible member extending away from said rigid member at said opposite edge thereof a substantial distance,

(d) said handle and rigid member cooperating with said flexible member to cause said free end of said flexible member to be pressable against said surface to be cleaned while said fixed end of said flexible member is being held by said outer peripheral surface of said rigid member to collect said materials being cleaned from said surface,

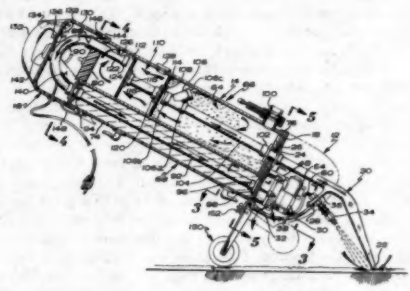
(e) and said flexible member being self biased by said fixed connection to said outer periphery of said rigid member to return to the configuration of said outer peripheral surface of said rigid member when said handle and rigid member release said flexible member from said surface being cleaned.

4,686,735

MODULAR CARPET CLEANING APPARATUS

Eldred E. Soeffker, 2805 Sycamore La., Plymouth, Minn. 55447, and Lou Rukavina, 1659 Maple Knoll Dr., Falcon Heights, Minn. 55113

Filed Feb. 28, 1985, Ser. No. 706,667
Int. Cl.[4] A47L *11/30*
U.S. Cl. 15—320 **20 Claims**



1. A floor cleaning device comprising:

an elongated, generally cylindrical separation tank having first and second ends;

an elongated cleaning solution tank extending generally parallel to said separation tank and having first and second ends;

wheel means adjacent said first ends of said separation tank and said cleaning solution tank for rolling support of said tanks on a floor surface;

a mounting plate extending transversely with respect to said tanks at said first ends thereof and having first and second apertures therethrough;

a vacuum pump having an inlet and an outlet, said inlet being connected through said first aperture to said separation tank by a vacuum tube, and said vacuum pump being supported on said mounting plate forwardly of said first ends of said tanks;

a vacuum nozzle having a tip positioned for suction cleaning of a floor surface, said nozzle being connected by a vacuum separation tube to the interior of said separation tank;

a spray pump having an inlet and an outlet, said inlet being connected through said second aperture with the interior of said cleaning solution tank, and said spray pump being supported on said mounting plate forwardly of said first ends of said tanks; and

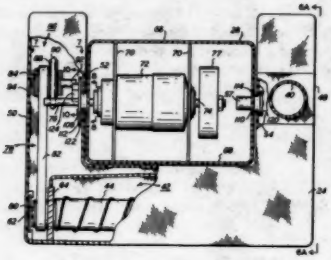
a spray nozzle connected to said spray pump outlet, said spray nozzle being supportably positioned to direct cleaning solution onto a floor surface.

4,686,736

VACUUM CLEANER

Salvatore Petralia, Sayreville, and H. Gerald Young, South Plainfield, both of N.J., assignors to The Regina Co., Inc., Rahway, N.J.

Filed Feb. 19, 1986, Ser. No. 832,510
Int. Cl.[4] A47L *5/32*
U.S. Cl. 15—332 **18 Claims**



1. In a vacuum cleaner having a lower body moveable along the floor, a brush rotatably mounted in said lower body and extending from the bottom thereof toward the floor, an upper body mounted on said lower body for tilting movement about an axis, a motor and fan assembly associated with said upper body for pulling a vacuum therein, said upper body being selectively connectable and disconnectable in vacuum communicating relationship with said lower body, respectively for floor cleaning and above the floor cleaning operations, the improvement comprising a mechanism for driving said brush having a member connected to said upper body and extending therefrom into said lower body said member being disposed eccentrically with respect to said axis and being moveable about an arc between positions on one side of a given position to provide for floor cleaning operation to a second position when said upper body is tilted in a direction opposite to said one direction from said given position to provide for said above the floor cleaning operation, means for coupling said motor to said brush including a belt and a pulley assembly moveably mounted in said housing, said pulley assembly having a pin, a pulley around which said belt is entrained, said pulley being rotatably mounted on said pin, said pulley having an extension roller also rotatably mounted on said pin, said motor having a shaft engagable with said extension roller, said pin being engagable by said member when said upper body is tilted in said opposite direction to move said pulley assembly away from said motor shaft and disengage said motor shaft from said extension roller thereby disconnecting driving power from said brush.

4,686,737

DESOLDERING TIP ASSEMBLY

William S. Fortune, 29866 Cuthbert St., Malibu, Calif. 90265

Filed Aug. 28, 1985, Ser. No. 770,096
Int. Cl.[4] A47L *9/02*
U.S. Cl. 15—415 R **9 Claims**

1. An end cap and replaceable nozzle element combination for a hand held, vacuum stroke desoldering tool of the character having a hollow cylindrical barrel body portion, said combination comprising:

(a) an end cap having

(i) a frusto-conical forward surface diverging rearwardly from its front tip end,

(ii) a rear surface, and

(iii) a central, nozzle retaining bore axially therethrough, said bore having

(A) a first diameter from its forward end to a point rearwardly therefrom, and

(B) a second, larger diameter rearwardly from said point and forming thereby a nozzle element retaining and centering shoulder;

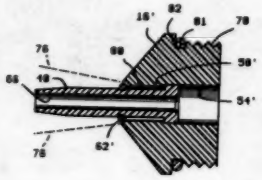
(b) a nozzle element having

(i) an elongate cylindrical body,

(ii) a central, axial bore therethrough,

(iii) an outer diameter extending from its forward portion rearwardly and being significantly less than said first diameter of said end cap bore,

(iv) a rear portion having an enlarged diameter approximately equal to said second, larger diameter of said end cap bore and forming a retaining collar of the character to cooperate with said nozzle element retaining and centering shoulder of said end cap, and



(v) and O-ring retaining groove displaced in the outer surface of its said elongate cylindrical body and spaced forwardly from said retaining collar; and

(c) a resiliently deformable O-ring disposed in said retaining groove compressively between said nozzle element and said forward tip end of said end cap,

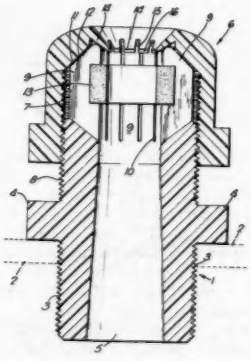
the axial distance between said O-ring retaining groove and retaining collar of said nozzle element being approxequal to that between said forward tip end of said end cap and said nozzle element retaining and centering shoulder of said bore of said end cap whereby said O-ring is axially sealingly compressed against said forward tip end of said end cap.

4,686,738

CABLE LEAD-IN DEVICE

Ake Bladh, Lanna, Sweden, assignor to Elektro-Bladh AB, Bredaryd, Sweden

Filed Sep. 18, 1985, Ser. No. 777,408
Claims priority, application Sweden, Sep. 26, 1984, 8404815
Int. Cl.[4] A41D *13/00*
U.S. Cl. 16—2 **20 Claims**



1. A cable lead-in device comprising:

a nipple member having external threads and a bore for receiving a cable, said nipple member having first clamping means movable to contact and clamp the cable within

the nipple member, said first clamping means having first operating means;

a nut member having a bore for receiving said cable and internal threads to cooperate with said external threads and a second operating means to cooperate with said first operating means to produce said clamping contact when tightening said nut member; said nut member further having a second clamping means extending obliquely inwardly and surrounding said cable, said first clamping means and said nut member having cooperating surfaces to move said second clamping means when tightening said nut member to a position substantially, axially outwardly to clampingly engaging the cable.

4,686,739

DOOR CLOSER

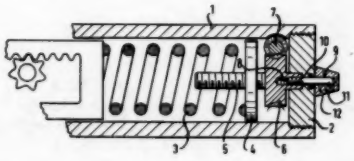
Karl Fritsche, and Wilhelm Vahs, both of Stuttgart, Fed. Rep. of Germany, assignors to Geze GmbH, Leonberg, Fed. Rep. of Germany

Division of Ser. No. 494,928, May 16, 1983, Pat. No. 4,590,639. This application May 22, 1986, Ser. No. 866,219

Claims priority, application Fed. Rep. of Germany, Jun. 29, 1982, 3224300

Int. Cl.[4] E05F *1/08*

U.S. Cl. 16—79 **2 Claims**



1. A door closer adapted to generate a door closing force which can be adjustably selected to suit a range of door sizes, the door closer comprising: a housing having first and second end faces; compression coil spring means disposed within said housing and having first and second ends; a piston movably disposed within said housing, wherein said first end of said spring means bears on said piston and exerts a spring bias thereon; means for coupling said piston to a door, whereby movement of said piston in said housing produces movement of said door and vice-versa; a spring plate disposed at said second end of said spring means adjacent said second end face of said housing, said spring plate having a threaded bore; a threaded spindle extending through said threaded bore in said spring plate; actuation means cooperating with said threaded spindle and accessible from outside of said housing to produce rotary adjustment movement of said threaded spindle within said housing to thereby adjust the position within said housing of said spring plate and said second end of said spring means relative to said first end of said spring means to adjustably vary said spring bias, and thus the closing force exertable by said door closer on said door; a linearly movable indicator device disposed at said second end face of said housing and readable from outside of said housing, and gearing means coupling said linearly movable indicator device to said spring plate, whereby adjustment movement of said spring plate is accompanied by corresponding movement of said indicator device, so that a unique position of said indicator device is associated with each position of said spring plate, thereby providing an unambiguous indication of the selected closing force corresponding to the prevailing level of said spring bias.

4,686,740

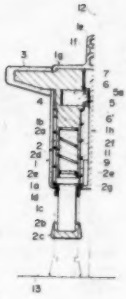
STOPPER FOR DOOR

Hiroyuki Ishii, Tokyo, Japan, assignor to Sugatsune Industrial Co., Ltd., Tokyo, Japan

Filed Jul. 25, 1985, Ser. No. 758,687

Int. Cl.[4] E05C *1/02*

U.S. Cl. 16—85 **4 Claims**



1. A stopper for a movable member such as a door or the like, comprising:

(a) a hollow body adapted to be secured to the member, said body including a lower end opening, a front wall formed with a vertically extending front guide slot, and a rear wall,

(b) rod means positioned in said housing for slidable movement in an upward and downward direction relative to said housing, the lower portion of said rod means projecting downwardly below said lower end opening of said housing for stopping contact with a supporting surface, said rod means being constructed and arranged to be axially contractible,

(c) a laterally projecting pedal positioned at the top of said rod means by means of which said rod means can be depressed relative to said housing, said pedal traveling in said front guide slot,

(d) means for biasing said pedal and said rod means upwardly away from a stop position,

(e) an actuator mounted in said rod means for rotation about an axis generally perpendicular to the axis of said rod means, said actuator having a portion extending laterally and rearwardly from said rod means, said actuator being formed with symmetrical, opposed recesses in the laterally extended portion thereof,

(f) a second guide slot in the rear wall of said housing, said actuator being movable upwardly and downwardly in said second guide slot, said guide slot being formed with or having positioned therein first and second contact points for contacting and orienting said actuator as said actuator travels in said slot,

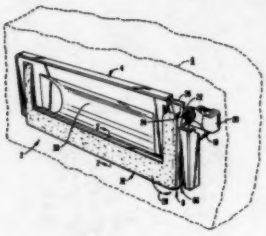
whereby depression of said rod means to a stop position causes said actuator to engage said second contact point and be so oriented to retain said rod means in said stop position, and subsequent depression of said rod means effects contraction of said rod means and reorientation of said actuator by said first and second contact points to permit said actuator to be raised in said second guide slot to return said rod means to a rest position.

4,686,741

PADDED AUTOMOTIVE CASKET HANDLE

Ronald D. Moore, Troy; James D. Kavanaugh, Dearborn; Richard A. Phelps, Ferndale, and Michael C. Howard, Mt. Clemens, all of Mich., assignors to Chivas Products Limited, Sterling Heights, Mich.

Filed Feb. 27, 1986, Ser. No. 834,005
Int. Cl.[4] E05B *5/02*
U.S. Cl. 16—112 **5 Claims**



1. A padded casket-type automotive handle, for mounting to a generally vertical support surface, comprising:

a generally U-shaped frame having an elongate base and legs, the frame pivotally mounted to the support surface at the distal ends of the legs, the frame having an outside surface facing the support and an inside surface facing away from the support surface;

an outside cushion member;

outside means for mounting the outside cushion member to the outside surface of the frame;

an inside cushion member;

inside means for mounting the inside cushion member to the inside surface of the frame;

a selected one of the outside and inside mounting means including:

a first mounting element extending from the selected cushion member; and

a second mounting element, engageable with the first mounting element, mounted to the frame, at least one of the first and second mounting elements being deflectable;

the other of the outside and inside mounting means including:

a mounting post extending from the other cushion member; and

a push lock fastener secured to the frame and positioned for receipt of the mounting post;

the outside and inside cushion members including outside and inside cushion cores and outside and inside covers covering the outside and inside cushion cores, the covers having seamless, smooth exposed surfaces and edges; and

the base including outside and inside recesses formed in the outside and inside surface sized to partially house the outside and inside cushion members, respectively.

4,686,742

AUXILIARY HANDLE FOR A DOOR

Allan J. Arnold, 1383 W. "E" St., #4, Hastings, Nebr. 68901

Filed Jul. 31, 1986, Ser. No. 891,186
Int. Cl.[4] E05B *1/00, 5/02*
U.S. Cl. 16—112 **1 Claim**

1. In combination,

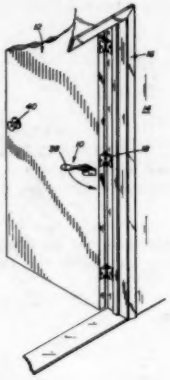
a wall means having a door opening formed therein,

a door casement means extending at least partially around said door opening including a top casement member having first and second side casement members extending downwardly from opposite ends thereof,

a door including opposite sides, top and bottom edges, and opposite sides edges,

hinge means hingedly securing one of said side edges of said door to said first casemenet member whereby said door may be moved between open and closed positions, a door knob attached to the door adjacent the other of said side edges of said door,

an auxiliary handle secured to one of said sides of said door adjacent said one side edge thereof whereby said handle may be grasped, when said door is in its open position, to pull said door towards its closed position, said auxiliary handle being at approximately the same height and spaced from the door knob, said auxiliary handle being pivotally mounted on said door so that it may be moved between an



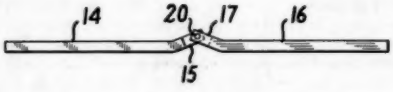
inoperative and operative positions, said auxiliary handle comprises a bracket secured to said door and a handle member pivotally secured to said bracket, said handle member being disposed at an acute angle relative to the door and angled toward the door knob, said bracket comprises a base portion secured to said door and a pair of spaced-apart legs secured thereto and extending therefrom, said handle member being pivotally secured to said legs, said legs extend outwardly and horizontally from said base portion toward said other of said side edges at an acute angle to the plane of said door, the leg closer to the door knob being shorter in length than the other leg.

4,686,743

HINGE INCORPORATING LEAF PADS AND TABS OF UNIFORM THICKNESS

Charles R. Suska, R.R. 1, Box 14, Roxbury, Conn. 06783

Continuation of Ser. No. 687,733, Dec. 31, 1984, abandoned. This application Jun. 25, 1986, Ser. No. 880,340
Int. Cl.[4] E05D *5/06*
U.S. Cl. 16—389 **8 Claims**



1. A low cost hinge for moderate loads comprising a pair of leaves, the leaves including mounting pads from which extend spaced interfitting tabs, attachment means for the mounting pads adapted to be used to attach them to a door and jamb, the mounting pads and said tabs having the same uniform thickness throughout the entire extent of the leaves, axially aligned holes in the tabs parallel to the planes of the mounting pads, and a hinge pin extending through the holes in the tabs.

4,686,744

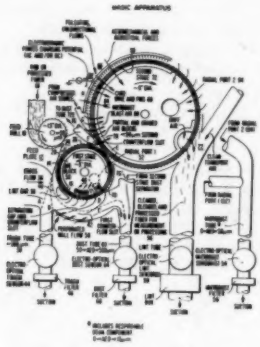
METHODS FOR AEROMECHANICAL AND ELECTRODYNAMIC RELEASE AND SEPARATION OF FOREIGN MATTER FROM FIBER

Frederick M. Shofner, Knoxville, Tenn., assignor to ppm, Inc., Knoxville, Tenn.

Continuation of Ser. No. 716,149, Mar. 26, 1985, abandoned, which is a division of Ser. No. 552,061, Nov. 15, 1983, Pat. No. 4,512,060, which is a continuation-in-part of Ser. No. 428,608, Sep. 30, 1982, abandoned. This application Feb. 6, 1986, Ser. No. 826,897

Int. Cl.[4] D01B *3/00*

U.S. Cl. 19—200 **31 Claims**



1. A method for treating fiber for release and separation of foreign matter from the fiber comprising transporting the fiber to a treating station and subjecting the fiber at said treating station to a combination of outward centrifugal forces balanced against inward aerodynamic drag forces to achieve controlled release and separation of foreign matter in particle sizes of predetermined classifications.

4,686,745

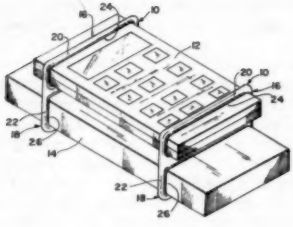
COUPLER AND PROTECTOR DEVICE FOR TWO REMOTE CONTROL UNITS

Lorraine M. Butler, 86-69 Springfield Blvd., Queens Village, N.Y. 11427

Filed Jul. 30, 1986, Ser. No. 890,505

Int. Cl.[4] B65D *67/02*

U.S. Cl. 24—17 B **7 Claims**



1. A coupler and protective device to be used by a person for two remote control units having backs, comprising: a pair of separate linearly thin one piece elastic readily laterally deformable upon application substantially square straps, each strap of said pair of straps including an upper portion and a lower portion attached thereto and being coplanar and having a separating partition, said upper portion being a first rectangular frame having a first aperture and a top edge and being separated by said partition from said lower portion being a second rectangular frame having a second aperture and a bottom edge so that one of the two remote control units can be inserted through said first aperture of each of said elastic straps while other of said two remote control units can be inserted through said second aperture of each of said elastic straps in the back to back relationship allowing the person to use both units at the same time, each of said first and second rectangular frames having a first position and a second position, said top edge and said partition and said bottom edge remaining same length and substantially square during said lateral deformation of said first position while said top edge and said partition and said bottom edge becoming different lengths during said lateral deformation of said second position.

4,686,746

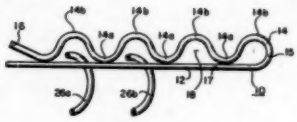
CHAIN SEPARATOR MEANS

Ronald R. Lockhart, 615 Colonel Dewees Rd., Wayne, Pa. 19087

Filed Feb. 6, 1984, Ser. No. 577,163

Int. Cl.[4] A44C *5/02;* **F16G** *15/00*

U.S. Cl. 24—116 R **14 Claims**



1. A device for separating at least two chains, comprising a flexible single piece of: a chain separator means including a pair of elongated members and a biasing means urging said elongated members in close substantially parallel relationship to each other; at least one of said elongated members having a plurality of first portions extending toward the other elongated member and a plurality of second portions alternatingly spaced between said first portions, said second portions each extending away from the other elongated member for a distance sufficient to accomodate a ring of one of said neck chains.

4,686,747

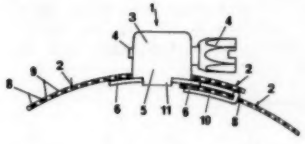
WORM DRIVE CLIPS

Samuel Bäkdahl, Östvänget 4, DK-7480 Vildbjerg, Denmark

Continuation of Ser. No. 666,326, Oct. 30, 1984, abandoned. This application Jun. 18, 1986, Ser. No. 875,676

Int. Cl.[4] B65D *63/00*

U.S. Cl. 24—274 R **4 Claims**



1. Worm drive clip comprising a housing, a driving worm screw journalled in the housing with an axis of the worm screw extending in a longitudinal direction of the housing, said housing comprising an upper part and a bottom part for enclosing the worm screw, and a flexible band one end of which is insertable in the housing in a gap between the worm screw and the bottom part and engageable with the worm screw via slanted transverse ribs and slanted transverse slots formed in the band, the bottom part of the housing includes means engageable with one transverse slot of the band at the other end of the band, wherein said means engageable with said one transverse slot of the band comprises a flap of a ductile, bendable material con-

nected to the bottom part and projecting freely outwardly from said housing to form an end of said bottom part extending in the longitudinal direction of the housing, said flap having a width slightly less than the length of the transverse slots of the band so that the free end thereof can be inserted in and with a certain length through a transverse slot of the band between a pair of transverse ribs, and wherein all of the transverse slots of the band are slanted and positioned equally spaced by the transverse ribs along an entire length of the band, the transverse ribs being slanted in conformance with a pitch of the worm screw, the flap in a mounted position of the worm drive clip around a cylindrical body after insertion through the selected slot being bent backwards so that said certain length of said flap is wedged between the bend and the cylindrical body.

4,686,748

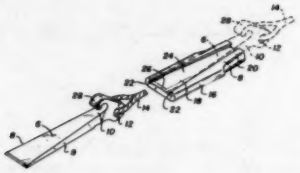
ATTACHMENT DEVICE

Pekka J. Kaivanto, 32 - 1702 Newton Avenue, Victoria, British Columbia, Canada V8R 2R2

Filed May 30, 1986, Ser. No. 868,963

Int. Cl.[4] B42F *1/00*

U.S. Cl. 24—522 **6 Claims**



1. A clamp to attach to a flexible sheet, the clamp comprising:

a first member with sides narrowing longitudinally to a first end and inclining upwardly inwardly;

means at the first end of the first member to receive attachment means;

a second member comprising a main body formed with a recess that narrows longitudinally to a first end and with interior sides that incline upwardly inwardly, the recess having a base that inclines upwardly from each side to its middle;

whereby the first member can be received within the second member with the flexible sheet clamped between.

4,686,749

CAPPED EYELET FOR ATTACHING SNAP FASTENER

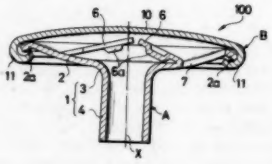
Takeo Fukuroi, Uozu, and Akira Tanaka, Kurobe, both of Japan, assignors to Yoshida Kogyo K.K., Tokyo, Japan

Filed Oct. 18, 1985, Ser. No. 789,023

Claims priority, application Japan, Oct. 22, 1984, 59-159335[U]

Int. Cl.[4] A44B *1/18*

U.S. Cl. 24—691 **6 Claims**



1. A capped eyelet for attachment of a snap fastner member tp a garmet, comprising:

(a) an eyelet body having a tubular shank with a longitudinal axis, and a substantially circular flange extending radially outwardly from one end of said shank substantially in a plane, said flange having a plurality of buffer wings projecting axially outwardly from said flange and away from said shank, each of said buffer wings lying at an acute angle with respect to the general plane of said flange, each said buffer wing having a hollow rib projecting from its under surface in overlying relation to said shank;

(b) a cap covering said flange and having a convex top wall and a peripheral edge clinched over a periphery of said flange; and

(c) said buffer wings being resiliently deformable for absorbing an axial force applied to said shank when said capped eyelet is axially compressed for being joined to the snap fastener member, said rib of each buffer wing being engageable with said one end of said shank, upon the deformation of said buffer wings, for assisting in absorbing the axial force.

4,686,750

AUTOMATIC CLIP MOUNTING DEVICE

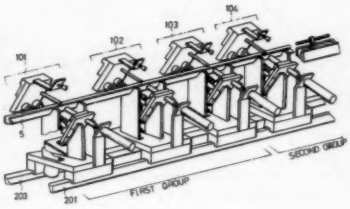
Shoji Murakawa, Kaizu, Japan, assignor to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Dec. 20, 1985, Ser. No. 811,874

Claims priority, application Japan, Dec. 21, 1984, 59-271574

Int. Cl.[4] B23P *23/04*

U.S. Cl. 29—34 R **1 Claim**



1. An a· ·matic clip mounting device comprising:

main base;

support bed mounted to said main base for holding an elongated work movable longitudinally step-by-step;

a clamp device mounted to said main base for clamping the work, between movements thereof, to said bed;

a support base mounted for movement generally at right angles to the work;

a punching device mounted to said support base for punching a hole in the work when clamped by said clamp device;

a clip setting device mounted to said support base for extracting a clip from a supply thereof and gripping the clip and inserting it in a hole previously punched in the work by said punching device;

means mounted to said main base for moving said support base between a punching and clip extracting position, wherein said punching device can punch a hole in the work and the clip setting device can extract and grip a clip, and an inserting position wherein said clip setting device can insert a clip in a hole previously punched in the work by said punching device; and

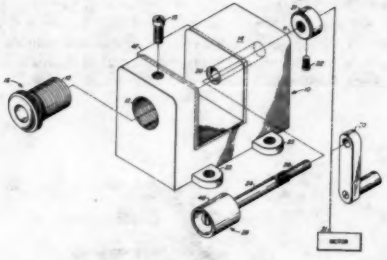
means for operating said punching device to punch a hole in the work and for operating said clip setting device to extract and grip a clip when said support base is in said punching and clip extracting position, and for operating said clip setting device to insert a clip in a hole in the work, previously punched therein by said punching device, when said support base is in said inserting position.

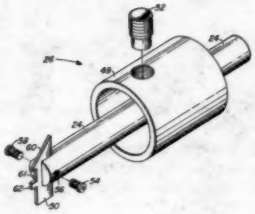
4,686,751

CARTRIDGE CASE TRIMMER

Doyle D. Gracey, P.O. Box 155, Tehachapi, Calif. 93561

Filed Aug. 11, 1986, Ser. No. 895,296
Int. Cl.[4] B21D *51/54*; F42B *3/00*
U.S. Cl. 29—1.32 **15 Claims**





1. A trimmer for cartridge cases comprising:
a base;
a bearing housing mounted to said base;
a shaft inserted into said bearing housing;
means for holding said shaft within said bearing housing attached to said shaft;
a cutter assembly mounted to said shaft, said cutter assembly further comprising a cutter with a first cutting edge for an inside chamber, a second cutting edge for length and a deburring edge which make three distinct cuts on the mouth of said cartridge case;
a case holder housing mounted to said base with an opening axially aligned with said shaft;
a cartridge case holder mounted within said case holder housing with an opening shaped to match said cartridge case's external dimensions and a shoulder stop for indexing on the shoulder of said cartridge case; and
means for turning said shaft.

4,686,752

METHOD OF FORMING SLOTS IN A MATERIAL-RETAINING PLATE FOR A PACKED COLUMN REACTOR IN AN ANALYTICAL INSTRUMENT

Thomas D. Sharples, Atherton, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Division of Ser. No. 628,928, Jul. 9, 1984, abandoned. This application May 12, 1985, Ser. No. 734,626
Int. Cl.[4] B23P *15/16, 17/00*; B21D *28/00*
U.S. Cl. 29—163.5 R **4 Claims**

1. A method of forming slots of a predetermined width in a material-retaining plate, said method comprising the steps of:
perforating said plate in a pattern defining a selected array of slots and bending a portion of said plate within each set of slots laterally from the plane of said plate to form openings in said plate;
placing a material of uniform thickness within each of said openings, said material having a thickness substantially equal to a predetermined width;
re-bending said portions of said plate toward the plane of

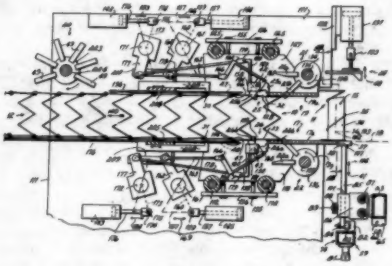
said plate to engage said material and pressing each of said portions against said material to form a slot having a width approximating the width of said material; and
removing said material from said plate.

4,686,753

COIL SPRING ASSEMBLY MACHINE

Henry Zapletal, Carthage, Mo.; Horst F. Wentzek, and George M. Chembakaffery, both of Kenosha, Wis., assignors to Leggett & Platt, Incorporated, Carthage, Mo.

Division of Ser. No. 300,995, Sep. 10, 1981, Pat. No. 4,492,298. This application May 17, 1984, Ser. No. 611,581
Int. Cl.[4] B21F *15/02*
U.S. Cl. 29—281.4 **10 Claims**



1. A machine for clamping juxtaposed coil springs together prior to and during tying said springs one to the other, said machine comprising
a front die and a rear die cooperable to clamp together adjacent end loops of leading and trailing coil springs,
first means for pivoting said rear die between an active position where said rear die functions as a position stop for a trailing spring as that spring is moved past said front die and as a stop for a leading spring as that leading spring is juxtaposed to said trailing spring, and an inactive position where the tied connection of said leading spring and said trailing spring is allowed to pass said rear die after tying said end loops of said springs one to the other, and
second means for pivoting said front die between an active position where said front die cooperates with said rear die to clamp said end loops of said leading spring and said trailing spring together while said springs are being tied together, and an inactive position where the tied connection of said leading spring and said trailing spring is allowed to pass after said tied connection has been established, and
said first and second means for pivoting said dies being

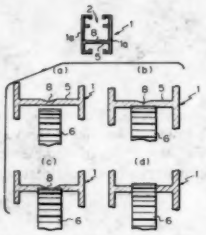
operable independently so as to enable said dies to be pivoted independently of one another.

4,686,754

METHOD FOR MANUFACTURING A HEAT INSULATING SHAPED BAR

Yoshitaka Nagai, and Nobushige Doguchi, both of Toyama, Japan, assignors to Yoshida Kogyo K. K., Tokyo, Japan

Filed Jun. 22, 1984, Ser. No. 623,171
Claims priority, application Japan, Jun. 30, 1983, 58-116912
Int. Cl.[4] B23P *17/00*
U.S. Cl. 29—418 **2 Claims**



1. In a method for manufacturing a heat insulating shaped bar comprising steps of:

(a) preparing a blank of an elongated metal shaped bar including a pair of spaced outer walls, a first interrupted partition wall extending between said outer walls so as to define a first longitudinal groove between said outer walls on one side thereof and a second continuous partition wall connecting said outer walls together so as to define a second longitudinal groove between said outer walls on the other side thereof,

(b) placing a heat-insulating sheet onto the bottom of said first groove and thereafter filling said first groove with heat insulating resin,

(c) forming a longitudinal gap substantially in the central portion of said second partition wall to thereby separate the same into two wall sections and

(d) placing a heat-insulating sheet onto the bottom of said second groove and thereafter filling said second groove with heat insulating resin, said method is characterized in that said second partition wall includes a longitudinal recess having sloped sides substantially along its central portion on the surface thereof which faces away from said second groove, in that said longitudinal gap is formed by cutting the material of said second partition wall corresponding to said recess by a rotary cutter from one side of said second partition wall which is opposite to said recess and in that the width of said recess is less than or equal to that of said rotary cutter.

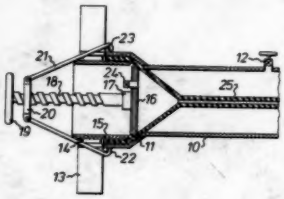
4,686,755

METHOD FOR ENCLOSING A BODY IN A RELATIVELY THICK ENCLOSURE OF ELASTIC MATERIAL

Mogens P. Jensen, Mörarpsgårdsvägen 8, S 26034 Mörarp, Sweden

PCT No. PCT/SE84/00361, § 371 Date Jun. 11, 1985, § 102(e) Date Jun. 11, 1985, PCT Pub. No. WO85/01912, PCT Pub. Date May 9, 1985
PCT Filed Oct. 29, 1984, Ser. No. 744,814
Claims priority, application Sweden, Oct. 28, 1983, 83059279
Int. Cl.[4] B23P *11/02;* **B29C** *49/00*
U.S. Cl. 29—450 **9 Claims**

1. A method of enclosing a body in a relatively thick enclosure of elastic material, especially rubber, comprising inserting a body of elastic material in the form of a sleeve and the like having an opening at one end and an internal cavity of cross-sectional area substantially smaller than that of the body to be enclosed into a tight casing of rigid material; widening said one end of the elastic body and sealingly securing the widened end to wall portions of the casing which define an entrance opening to the casing; sealing the widened end by clamping a sealing member thereagainst; expanding the elastic body toward the casing by supplying fluid under pressure to the cavity of the elastic body through a valve in the sealing member, and thereby forcing air from a space between the casing and the elastic body while venting the air via a valve mounted in a wall of the casing; continuing to supply the fluid until the outer side of the elastic body substantially engages the casing; closing the



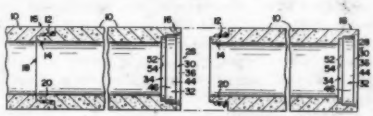
casing valve in order to prevent reentry of air between the expanded body and the casing and thereby maintain the elastic body in an expanded state and then removing the sealing member from the expanded elastic body and inserting the body to be enclosed into the expanded elastic body; opening the valve in the casing, whereby the elastic body seeks to resume its original dimension and thereby tightly and with considerable force engages and tends to compress the body inserted therein; releasing the widened end of the elastic body from the casing; and removing the body to be enclosed, with the elastic body enclosing the same, from the casing.

4,686,756

METHOD OF PRODUCING A SELF ALIGNING PIPE WITH CONFIGURED JOINT

C. R. Joelson, 2501 Bayshore Rd., Nokomis, Fla. 33555

Division of Ser. No. 603,343, Apr. 24, 1984, Pat. No. 4,565,381. This application Jan. 9, 1986, Ser. No. 817,417
Int. Cl.[4] B21D *39/02*
U.S. Cl. 29—463 **9 Claims**



1. A method of producing a self aligning concrete pipe to improve the seal of the joint cooperatively formed between adjacent concrete pipes wherein each concrete pipe includes a male and female joint member formed on opposite ends thereof to operatively engage the corresponding joint member formed on the next adjacent concrete pipe, said method comprises of using a first pallet and a second pallet to produce said male and female joint members respectively, said first pallet configured to produce said male joint member including a tongue element of a predetermined peripheral configuration extending outwardly from the concrete pipe, said second pallet configured to produce said female joint member including a groove element inwardly from the end of the concrete pipe having the male joint member comprising an initial alignment stage including an outer alignment recess including a horizontal alignment step and a vertical alignment step having an inwardly inclined surface and a final alignment stage including an inner seat recess of a predetermined radial configuration correspond-

ing to said predetermined peripheral configuration of said tongue element such that as adjacent concrete pipes are assembled the outer end of said tongue element enters said outer alignment recess to horizontally and vertically align adjacent concrete pipes by engaging said horizontal and vertical alignment step permitting said tongue element to enter said inner seat recess to form the joint therebetween.

4,686,757

MACHINE TOOL CHUCK CONSTRUCTION

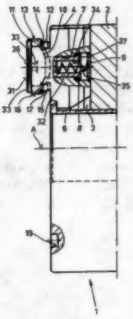
Karl Hiestand, Pfullendorf, Fed. Rep. of Germany, assignor to SMW Schneider & Weisshaupt GmbH, Fed. Rep. of Germany

Filed Jan. 16, 1986, Ser. No. 819,813

Claims priority, application Fed. Rep. of Germany, Jan. 17, 1985, 3501325

Int. Cl.⁴ B23Q *3/156*

U.S. Cl. 29—568 **9 Claims**



1. A machine tool and chuck jaw exchanging device, comprising a check body having a longitudinal axis, a basic jaw radially adjustable in said chuck body, a pallet rotatably movable about said chuck body axis, an attachment jaw engageably held by said pallet and being attachable to said basic jaw upon a relative rotation between said pallet and chuck body, said basic jaw having a face directed toward said attachment jaw with a projection of selected shape cross section corresponding to the shape of said selected cross section, each of said basic jaw and said attachment jaw having radially oriented outer and inner surfaces and bearing surfaces disposed between them perpendicular to and concentric with said longitudinal axis of said chuck body in the attaching position of said attachment jaw, and locking means effective in chucking position of said attachment jaw relative to said basic jaw to lock said jaws secure against rotation.

4,686,758

THREE-DIMENSIONAL CMOS USING SELECTIVE EPITAXIAL GROWTH

Michael S. Liu, Bloomington, Minn., and Bernd Hoefflinger, West Lafayette, Ind., assignors to Honeywell Inc., Minneapolis, Minn.

Division of Ser. No. 625,150, Jun. 27, 1984. This application Jan. 2, 1986, Ser. No. 815,480

Int. Cl.⁴ H01L *29/78, 27/02, 29/04*

U.S. Cl. 437—34 **7 Claims**

1. A process for making one above the other two field effect transistors sharing a common crystalline lattice structure of silicon, and in which the lower transistor is fabricated on a silicon crystal surface by forming in the surface source and drain areas which are aligned with a polysilicon gate insulated from said silicon surface, the process steps comprising:

forming a lower gate-oxide layer on said silicon surface;

forming a silicon gate member on said lower gate-oxide;

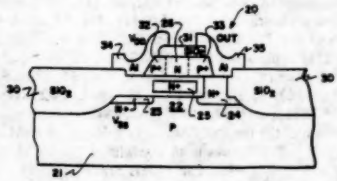
doping said silicon surface to form source and drain regions in alignment with said gate member, thereby forming a lower transistor;

forming a field oxide layer over said surface;

forming an upper gate-oxide layer over said gate member;

forming a via through said field oxide layer near said gate member to expose a portion of said silicon surface;

epitaxially growing silicon selectively from said silicon surface portion upwardly through said via and laterally over the surface of said upper gate-oxide layer, said epitaxial



silicon sharing a common crystal lattice structure with said lower transistor, said laterally grown epitaxial silicon being of lowly doped silicon as compared to the higher doped epitaxial silicon grown of the same type dopant grown in said via;

doping said epitaxial laterally grown silicon to form source and drain regions aligned with said gate member thereby forming an upper transistor having a common gate with said lower transistor and wherein both transistors are in a single unitary crystalline structure.

4,686,759

METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE

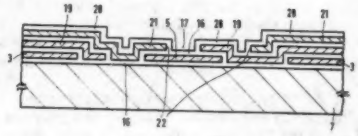
Jan A. Pals, Eindhoven, and Arend J. Klinkhamer, Nijmegen, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 12, 1984, Ser. No. 649,633

Claims priority, application Netherlands, Sep. 23, 1983, 8303268

Int. Cl.⁴ H01L *21/28, 21/30*

U.S. Cl. 437—51 **7 Claims**



1. A method of manufacturing an integrated circuit, said method comprising the steps of:

providing a semiconductor body having a surface and a contact region on the surface, said contact region having first and second opposite edges; and then

forming a first dielectric layer on the surface of the body, said first dielectric layer covering the contact region on its edges;

forming a first electrode layer on the first dielectric layer, said first electrode layer covering the first edge of the contact region;

forming a second dielectric layer on the first electrode layer;

forming a second dielectric layer on the second dielectric layer and on exposed portions of the first dielectric layer, said second electrode layer covering the second edge of the contact region, said first and second electrode layers forming a mask with an opening over the contact region; and

removing the dielectric over the contact region through the

mask opening by selectively etching the dielectric with respect to the electrode layers to form a contact window in the first dielectric layer.

4,686,760

METHOD OF MAKING PHOTOELECTRIC CONVERSION DEVICE

Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Japan

Continuation of Ser. No. 761,032, Jul. 31, 1985, abandoned, which is a division of Ser. No. 620,171, Jun. 13, 1984, which is a division of Ser. No. 554,807, Nov. 23, 1983, Pat. No. 4,527,006.

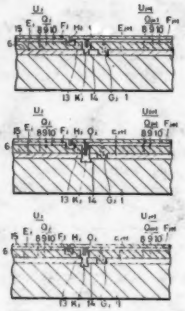
This application Mar. 31, 1986, Ser. No. 846,514

Claims priority, application Japan, Nov. 24, 1982, 57-206809; Nov. 24, 1982, 57-206806; Feb. 22, 1983, 58-28211; Apr. 29, 1983, 58-75713; Oct. 31, 1983, 58-204443

The portion of the term of this patent subsequent to May 6, 2003, has been disclaimed.

Int. Cl.[4] H01L *31/18*

U.S. Cl. 437—5 **21 Claims**



1. A method of making a photoelectric conversion device in which a plurality n (when n is an integer greater than one) of semiconductor element U_1 to U_n are sequentially formed side by side on a substrate having a insulating surface and connected in series one after another, the semiconductor element U_i (i=1, 2, . . . n) comprising a first electrode E_i on the substrate, a non-single-crystal semiconductor laminate member Q_i on the first electrode E_i, and a second electrode F_i on the laminate member Q_i, the second electrode F_{j-1} of the semiconductor element U_{j-1} (j=1, 2, . . . (n−1)) being connected via coupling portion K_j to the first electrode E_j, comprising the steps of:

forming a first conductive layer on the substrate;

forming (n−1) sequentially arranged first grooves G_1 to G_{n-1} in the first conductive layer to form therein n sequentially arranged first electrodes E_1 to E_n separated by the first grooves G_1 to G_{n-1}, respectively;

forming on the substrate a non-single-crystal semiconductor laminate layer having formed therein at least one semiconductor junction and continuously extending onto the first electrodes E_1 to E_n and into the first grooves G_1 to G_{n-1} so that the regions of the non-single-crystal semiconductor laminate layer on the electrodes E_1 to E_n may be non-single-crystal semiconductor laminate members Q_1 to Q_n;

forming (n−1) sequentially arranged second grooves O_1 to O_{n-1} extending through members Q_1 to Q_{n-1} and the first electrodes E_1 to E_{n-1} to expose therethrough the top portions and sides of the first electrodes E_1 to E_n, respectively;

forming on the substrate a second conductive layer continuously extending on the non-single-crystal semiconductor laminate member Q_1 to Q_n and into the second grooves $O_1$to O_{n-1} to provide coupling portions K_1 to K_{n-1}, the coupling portions K_1 to K_{n-1} being connected to the top portions and sides of the first electrodes E_1 to E_{n-1} through the second grooves O_1 to O_{n-1}, respectively; and

forming (n−1) sequentially arranged isolating portions H_1 to H_{n-1} in at least the second conductive layer to form therein n sequentially arranged second electrodes F_1 to F_n separated by the isolating portions H_1 to H_n and opposite the first electrodes E_1 to E_n through the non-single-crystal semiconductor laminate members Q_1 to Q_n, respectively, the second electrode F_{j-1} being connected to the first electrode E_j through the coupling portion K_j.

4,686,761

METHOD OF FABRICATION OF LOW CROSSTALK PHOTODIODE ARRAY

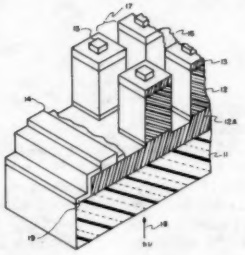
Michael Hacskaylo, Falls Church, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 714,423, Mar. 21, 1985, Pat. No. 4,646,120.

This application Oct. 31, 1986, Ser. No. 925,585

Int. Cl.[4] H01L *31/18*

U.S. Cl. 437—5 **6 Claims**



1. The method of forming an array of pixel photodiodes for a selected band of radiation comprising the steps of:

forming a crystalline substrate with a lattice structure compatible with the semiconductor materials used in said photodiodes;

epitaxially depositing on a substrate a base contact layer of semiconducting material transparent to said of radiation and doped to provide high conductivity through majority carriers of a first polarity;

epitaxially depositing on all but a small surface portion of said base contact layer a photo-current-generating layer of semiconducting material highly absorptive to said band of radiation and doped to provide medium conductivity through majority carriers of said first polarity;

epitaxially depositing on said photo-current-generating layer a contact cap layer transparent to said band of radiation doped to provide medium conductivity through majority carriers opposite in polarity to said first polarity;

removing small groove portions of said cap layer and all underlying portions of said photo-current-generating layer whereby these layers are divided into electro-optically isolated islands electrically interconnected through said base contact layer; and

forming a passivation coating over all the exposed surfaces of said layers.

4,686,762

FABRICATING SEMICONDUCTOR DEVICE WITH POLYSILICON PROTECTION LAYER DURING PROCESSING

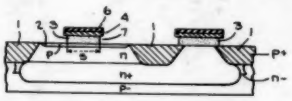
Sang-Hoon Chai, Daegu, and Jin-Hyo Lee, Qumi, both of Rep. of Korea, assignors to Electronics and Telecommunication Research Institute, Chungchungnam, Rep. of Korea

Filed Jul. 23, 1986, Ser. No. 889,491

Claims priority, application Rep. of Korea, Aug. 5, 1985, 5633/85

Int. Cl.[4] H01L *21/308*

U.S. Cl. 437—36 1 Claim



1. A process for fabricating a semiconductor device having a plurality of elements isolated in P⁻-type silicon substrate by steps of forming N⁺-type buried layer; implanting arsenic ions into the surface of said silicon substrate and diffusing it at 1200° C.; growing N⁺-type epitaxial layer having a thickness of 1.6 μm by doping phosphorus ions on said burried layer; etching a portion of the surface of said epitaxial layer in depth of 5500 Å with a mask; and implanting P⁺-type impurity ions through said mask at 925° C. by wet oxidation method to form an oxide layer of 10KÅ in thickness, said process comprising further the consecutive steps of

forming a base region by implanting boron impurity ions;

depositing a polysilicon layer of 3000 Å in thickness throughout the entire surface of said silicon substrate by LPCVD;

converting the conductivity of said polysilicon layer into N⁺-type conductivity by implanting arsenic impurity ions therein;

depositing the surface of said polysilicon layer consecutively with primary oxide layer having a thickness of 2000 Å and primary nitride layer having a thickness of 2000 Å by LPCVD;

defining an emitter portion and a collector portion to be formed in said N⁺-type polysilicon by photolithography and then etching unnecessary portions there of by dry etching, said N⁺-type polysilicon layer being overetched underneath said oxide layer so that the emitter width is formed smaller than 2 μm;

depositing a secondary oxide layer on the whole surface of said defined and overetched substrate by LPCVD and then etching completely the entire upper part of said deposited secondary oxide layer except the polysilicon side wall portions thereof;

depositing a secondary nitride layer of 2000 Å to 3000 Å in thickness thereon and then removing the entire upper part of said secondary nitride layer by plasma etching;

etching the silicon surface around said polysilicon layer to the extent of 1500 Å by dry etching and then growing oxide layer of 500 Å in thickness on the surface said etched portion;

depositing a tertiary nitride layer having thickness of 700 Å thereon by LPCVD and then removing the entire upper part of said tertiary nitride layer by plasma etching;

growing another oxide layer having a thickness of 2500 Å thereon and then removing said primary, secondary and tertiary nitride layers by wet etching;

depositing polysilicon layer having a thickness of 3000 Å on said removed portion and then converting said portion into P⁺-type conductivity by doping boron ions by thermal diffusion; and

defining a portion of said converted polysilicon layer by photolithography and dry etching method and then forming P⁺-type extrinsic base region by thermal diffusion.

4,686,763

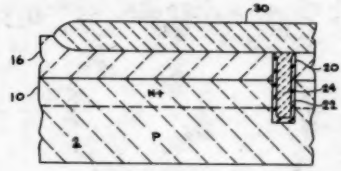
METHOD OF MAKING A PLANAR POLYSILICON BIPOLAR DEVICE

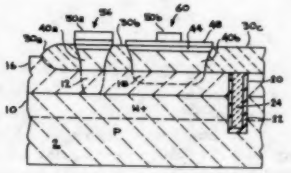
Mammen Thomas, San Jose, and Matthew Weinberg, Mountain View, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

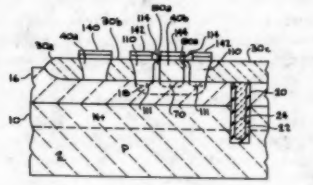
Filed Oct. 2, 1985, Ser. No. 782,838

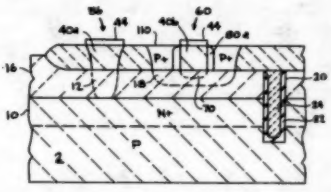
Int. Cl.[4] H01L *21/08, 21/302, 21/461*

U.S. Cl. 437—51 17 Claims









16. A method of forming a highly planarized integrated circuit structure containing one or more bipolar devices which comprises:

(a) forming a buried layer in at least a portion of a substrate parallel to a first surface thereon;

(b) forming an oxide layer on said first said first surface of said substrate;

(c) removing selective portions of said oxide layer to form openings therein extending to said first surface of said substrate;

(d) forming a polysilicon layer over said structure to fill said openings in said oxide layer;

(e) planarizing said polysilicon layer to a level at least equal to the top of said oxide layer; and

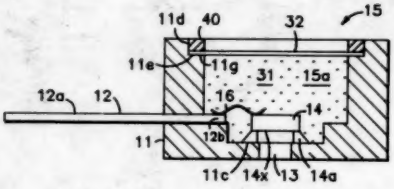
(f) doping said remaining polysilicon to form portions of said one or more bipolar devices.

4,686,764

MEMBRANE PROTECTED PRESSURE SENSOR

Victor J. Adams, Tempe, Ariz., and Carl E. Derrington, East Greenbush, N.Y., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 22, 1986, Ser. No. 855,012
Int. Cl.[4] G01L *7/08, 9/00*
U.S. Cl. 29—592 **13 Claims**



1. A method for forming an environmentally protected pressure sensor, comprising:

providing a dielectric body containing a cavity, wherein said cavity has a first surface for receiving a pressure sensor element and wherein said cavity has an opening communicating with said first surface and surrounded by a second surface;

mounting said pressure sensor element on said first surface;

filling said cavity around said pressure sensor element with a volume of a pressure transfer material exceeding the volume of said cavity around said sensor element up to said opening;

providing a flexible diaphragm intended for sealing said opening;

contacting a first portion of said diaphragm to a first portion of said second surface and an adjacent first portion of said pressure transfer material;

without removing said first portion of said diaphragm, rolling a second portion of said diaphragm across said opening in contact with a second portion of said pressure transfer material and a second portion of said second surface; and

squeezing any excess pressure transfer material out between a third portion of said diaphragm and a third portion of said second surface.

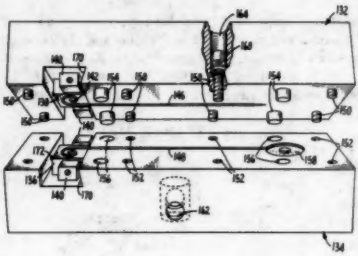
4,686,765

METHOD FOR MAKING AN INTRACOCHLEAR ELECTRODE ARRAY

Charles L. Byers, Vacaville, Calif.; Gerald E. Loeb, Clarksburg, Md.; Michael M. Merzenich, and Stephen J. Rebscher, both of San Francisco, Calif., assignors to Regents of the University of California, Berkeley, Calif.

Division of Ser. No. 607,019, May 3, 1984, abandoned. This application Apr. 22, 1986, Ser. No. 855,084
Int. Cl.[4] H01R *43/00*
U.S. Cl. 29—858 **19 Claims**

1. A method for making an intracochlear multielectrode array, having an apical portion and a basal portion and a spiral shape at least generally conforming to the scala tympani of a cochlea, said array comprising an elastomeric carrier having a plurality of metallic electrodes, each having an associated lead to form a plurality of leads extending from the basal portion into the apical portion of said array, supported in fixed positions by said carrier, said method comprising the steps of



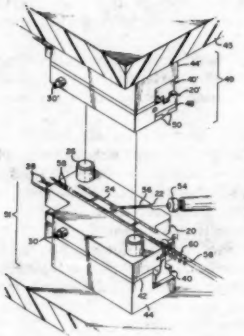
fabricating each elctrode and associated lead from a flattened metallic wire by forming said electrode on a first end of said wire to have a covex outer surface.

4,686,766

METHOD OF FORMING A FLEXIBLE STRIP OF ENCAPSULATED CONTACT MEMBERS

Jack F. Dubbs, Harrisburg, and Clyde K. Hanyen, Mechanicsburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Division of Ser. No. 682,480, Dec. 17, 1984, Pat. No. 4,586,607, which is a continuation of Ser. No. 453,310, Dec. 27, 1982, abandoned. This application Apr. 7, 1986, Ser. No. 827,923
Int. Cl.[4] H01R *43/00*
U.S. Cl. 29—883 **4 Claims**



1. A method for making a continuous strip of spaced-apart electrical contact sockets, said sockets having a conductor receiving end, a hollow conductor receiving body, and a mounting portion at the end of the socket opposite the conductor receiving end, said method comprising the steps of:

a. placing a plurality of the contact sockets in spaced apart relationship in a molding cavity with the mounting portions being received in apertures in said cavity;

b. inserting a polymeric material into said molding cavity thereby encapsulating the conductor receiving end and the hollow conductor receiving body and further forming a strip of spaced-apart contact sockets by said polymeric material extending between and attached to said contact sockets;

c. advancing said strip of contact sockets of step (b) such that a portion of said strip remains in said cavity;

d. refilling said cavity with additional contact sockets; and

e. inserting a polymeric material into said cavity thereby encapsulating the conductor receiving end and the hollow conductor receiving body of said additional contact sockets and further forming an additional strip of contact sockets as well as securing said additional strip of contact sockets to that portion of said strip left in said cavity thereby forming a continuous connected strips of spaced-apart electrical contact sockets.

4,686,767

METAL CUTTING SHEAR FOR A BACKHOE

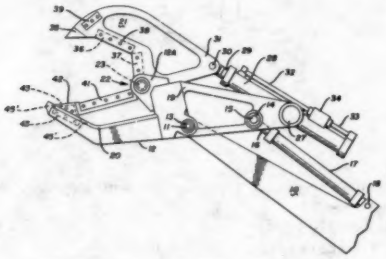
Michael Ramun, and John Ramun, both of Youngstown, Ohio, assignors to Allied Gator, Inc., Youngstown, Ohio

Filed Apr. 25, 1986, Ser. No. 856,017

The portion of the term of this patent subsequent to Jun. 9, 2004, has been disclaimed.

Int. Cl.[4] B23P *19/00*

U.S. Cl. 30—134 **21 Claims**



1. A cutting and manipulating attachment for a backhoe having a boom with a controlled piston and cylinder assembly connected thereto comprising: a shear having an elongated, unitary cast steel fixed cutting blade having a raised cutting edge portion and removable means attaching said fixed cutting blade to said boom, said fixed cutting blade having horizontally spaced, vertically positioned, parallel beam portions and horizontal sections therebetween, a unitary cast steel movable cutting blade having first, second and third cutting edge portions, means inwardly of a first end of said fixed cutting blade pivotally mounting said movable cutting blade therebetween in pivotal relation to said fixed cutting blade from an open position to a closed work piece shearing position, wherein said first cutting edge portion is directly adjacent to said means for pivotally mounting, wherein the length of said first cutting edge portion is substantially less than the length of said second cutting edge portion and wherein the length of the first cutting edge portion is substantially less than the length of said raised cutting edge portion of said fixed blade to facilitate the cutting taking place relatively close to said means for pivotally mounting, said fixed blade and the movable blade being structured to urge a workpiece being cut to move along said fixed cutting blade toward said means for pivotally mounted and to generate an increased shearing force and means for keeping the cutting edge portions of said movable cutting blade in shearing relation to said raised cutting edge portion of said fixed cutting blade through the entire extent of the shearing movement of the blades with respect to each other, said third portion of said movable cutting blade being sharpened and being directed generally toward said fixed cutting blade, said means for keeping the cutting edge portions of said movable cutting blade in shearing relation to said raised cutting edge portion of said fixed cutting blade comprising a slot in one of said horizontal sections of said fixed cutting blade and inwardly of said first end thereof and defining an elongated guide path, said slot being positioned and sized to receive and maintain said sharpened end portion of said movable cutting blade and said cutting edge portions of said movable cutting blade in shearing relation to a work piece disposed between said blades.

4,686,768

MEASURING CALLIPER

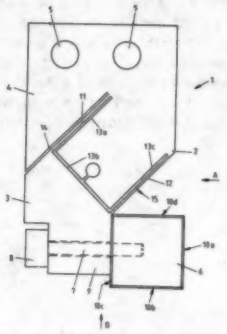
Rudolf Schneider, Reinach, Switzerland, assignor to Erowa AG, Reinach, Switzerland

Filed Sep. 22, 1986, Ser. No. 909,618

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1986, 3609283

Int. Cl.[4] G01B *5/02*

U.S. Cl. 33—172 B **7 Claims**



6. A measuring calliper for use with a measuring apparatus for determining at least two linear dimensions of a workpiece in two respective mutually perpendicular measuring directions, said measuring calliper comprising:

a calliper body member including first and second portions displaceable with reference to each other;

dimension sensing means mounted on said first portion, said dimension sensing means being operatively coupled to the measuring apparatus and having at least two freely exposed mutually perpendicular surfaces extending in said two measuring directions and engageable with the workpiece; and

at least two parallel elastically resilient connection members extending at an angle of 45° with reference to said two surfaces for connecting said first and second portions and enabling displacement therebetween.

4,686,769

MARKING GAUGE FOR USE IN MOUNTING HINGES

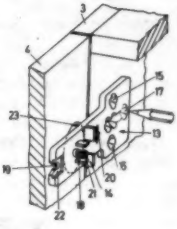
Erich Röck, Höchst, and Helmut Rupprechter, Lauterach, both of Austria, assignors to Julius Blum Gesellschaft m.b.H., Höchst, Austria

Filed Jun. 24, 1986, Ser. No. 877,792

Claims priority, application Austria, Jul. 8, 1985, 2012/85

Int. Cl.[4] B27G *17/08*

U.S. Cl. 33—197 **15 Claims**



1. A marking gauge for use in locating and marking the positions of hinge elements on elements of an article of furniture, said gauge comprising:

a plate member having opposite first and second sides to be positioned on surfaces of furniture elements;

a flange extending from at least said first side of said plate member to abut an edge of one furniture element;

said plate member including locating means for positioning said plate member with respect to a hinge arm mounting plate already mounted on the one furniture element, said locating means comprising a slot in said plate member to receive a screw of the mounting plate and a bolt extending from said plate member to be received in a slot in the mounting plate, said bolt having an enlarged head; and

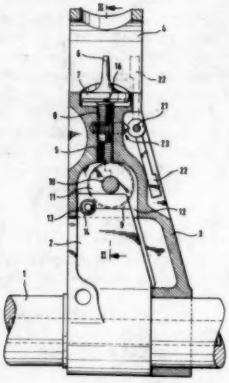
said plate member including marking means for, upon said plate member being located with respect to a furniture element, enabling marking on a furniture element of a position for mounting thereon of a hinge element.

4,686,770

MECHANICAL AIMING DEVICE FOR RIFLES

Friedrich Aigner, St. Valentin, Austria, assignor to Steyr-Daimler-Puch AG, Vienna, Austria

Filed Jan. 21, 1986, Ser. No. 821,027
Claims priority, application Austria, Jan. 22, 1985, 149/85
Int. Cl.[4] F41G *1/02*
U.S. Cl. 33—257 **10 Claims**



1. An adjustable sighting device for attachment to a rifle barrel, comprising

a finger mounted on said rifle barrel,

a front sight carrier connected to said finger, said front sight carrier including a front sight tunnel, said front sight carrier being slewable about a swivel axis,

a setting screw provided within said front sight carrier for displacing said front sight carrier laterally in a portion of an arc about said swivel axis, said setting screw having an axis perpendicular to said swivel axis,

a front sight disposed in said front sight tunnel, the height of said front sight being vertically adjustable by screwing said front sight into a bore in said front sight carrier, said bore being radial to said swivel axis,

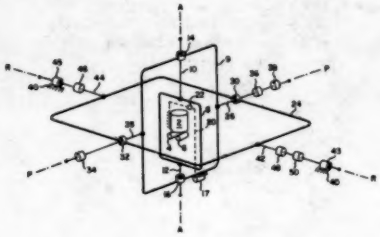
wherein the height and lateral displacement of said sighting device are adjustable independently of each other.

4,686,771

GYROCOMPASSING APPARATUS FOR STATIONARY EQUIPMENT

Thomas Beveventano, Washington Twp., Bergen County; Frank L. Rosen, Parsippany; Richard H. Wolff, Hillsdale, and Raymond Bendett, Ridgewood, all of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Aug. 28, 1986, Ser. No. 901,229
Int. Cl.[4] G01C *19/38*
U.S. Cl. 33—324 **16 Claims**



14. Gyrocompassing apparatus for stationary equipment, characterized by:

a first gimbal;

gyro means mounted to the first gimbal;

a case supported by the stationary equipment; means rotatably supported by the case for rotation about roll and pitch axes, said roll and pitch axes being transverse each to the other and being in a common plane;

the first gimbal rotatably supported by the means rotatably supported by the case for rotation about an azimuth axis, the center of gravity of the first gimbal and the gyro means mounted thereto being displaced with respect to the common plane of the transverse pitch and roll axes, whereby said first gimbal and the gyro means are in pendulous arrangement relative to the means rotatably supported by the case;

means arranged with the means rotatably supported by the case and operable for locking said means to prevent rotation about the pitch and roll axes and for unlocking said means to permit said rotation;

said means being initially locked and then unlocked for a predetermined interval during which the sensitive axis of the pendulous arrangement is levelled, and thereafter locked to strap-down the gyro means with respect to the roll and pitch axes;

means for sequentially rotating the first gimbal about the azimuth axis to a plurality of headings with respect to an initial heading, whereby the gyro means mounted to the first gimbal senses earth's rate at all of said headings and provides corresponding signals;

means arranged with the gyro means for sensing residual tilts of the means rotatably supported by the case from geodetic level and for providing corresponding signals;

means arranged with the means rotatably supported by the case for sensing the angles of rotation of said means about the roll and pitch axes and for providing corresponding signals; and

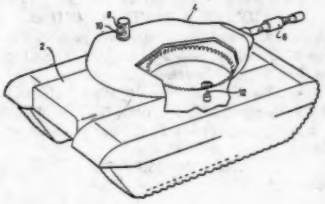
means connected to the gyro means, the residual tilt signal means and the angle of rotation signal means, and responsive to the signals therefrom for providing signals commensurate with the heading of the stationary equipment with respect to north, and with the attitude of the case with respect to geodetic level.

4,686,772

ELECTRONIC MAGNETIC COMPASS SYSTEM

Amos Sobel, Haifa, Israel, assignor to Elbit Computers Ltd., Haifa, Israel

Filed May 27, 1986, Ser. No. 866,719
Claims priority, application Israel, May 23, 1986, 78889
Int. Cl.[4] G01C 17/28, 17/38
U.S. Cl. 33—333 14 Claims



1. An electronic magnetic compass system for computing the magnetic heading of a vehicle having two iron bodies relatively movable with respect to each other about a vertical rotary axis comprising:

a non-pendulous triaxial magnetometer to be fixedly mounted on one of said bodies for outputting electrical signals corresponding to the three axial components on the magnetic field at the location of the magnetometer;

a first sensor on said one body for outputting electrical signals corresponding to the pitch of said one body;

a second sensor on said one body for outputting electrical signals corresponding to the roll of said one body;

an angle measuring device for outputting electrical signals corresponding to the angle of rotation between said two bodies about said vertical rotary axis;

a non-volatile memory for storing a plurality of pre-calibrated correction factors for correcting the effects of the permanent magnetic field and the induced magnetic field on the measurements of the magnetometer for each of a plurality of angles of rotation between the two bodies;

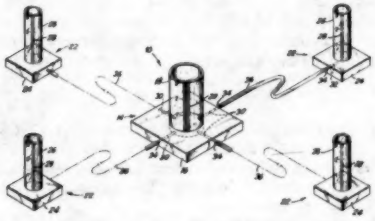
and an electronic computer for computing on a real-time basis the magnetic headings of both said bodies from said magnetic field electrical signals, as corrected by said stored correction factors for the respective angle of rotation, together with the pitch, roll and rotation angles electrical signals inputted into the computer.

4,686,773

STRUCTURE LEVELING SYSTEM

Aubrey W. Brewer, 6912 Martin Mill Pike, Knoxville, Tenn. 37902

Filed Jul. 7, 1986, Ser. No. 882,468
Int. Cl.[4] G01C 5/04, 9/22
U.S. Cl. 33—367 4 Claims



1. A structure leveling system comprising a plurality of members each including a base having a bottom and a transparent tube open at its top and upstanding from said base and provided with graduations at intervals along its length, the graduations on all said tubes corresponding whereby like graduations on said tubes denote identical distances above the bottoms of said bases, and means including flexible tubing interconnecting the bottoms of said tubes with each other, said plurality of members including a main member and a plurality of identical satellite members, and said flexible tubing connecting the base of said main member and the base of each of said satellite members, the upstanding tube of said main member being of larger inside diameter than the upstanding tubes of said satellite members.

4,686,774

METHOD FOR DEHYDRATION OF A COMPOSITION OF A FINE POWDER AND WATER

Tadashi Hiraiwa, and Eizi Ando, both of Shiojiri, Japan, assignors to Showa Denko K.K., Tokyo, Japan

Filed Aug. 28, 1986, Ser. No. 901,386
Claims priority, application Japan, Sep. 2, 1985, 60-191964
Int. Cl.[4] F26B 5/16; B01D 12/00
U.S. Cl. 34—9 12 Claims

1. A method for removing water from a composition consisting essentially of water and a fine ceramic powder, which comprises:

(a) adding to said composition a water-insoluble organic solvent at least in an amount sufficient to form an azeotrope with the water in said composition,

(b) converting the resulting mixed liquid into a W/O emulsion having minute ceramic particles contained in water droplets suspended in said emulsion, and

(c) removing the water and organic solvent from said emulsion.

4,686,775

ABSORBENT DRYING METHOD BY CONTACTING WITH A HYDROCARBON

Dennis A. Vauk, Santa Ana, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Continuation-in-part of Ser. No. 562,475, Dec. 16, 1983, abandoned. This application Oct. 24, 1985, Ser. No. 790,848
Int. Cl.[4] F26B 3/00; B01D 53/02; B01J 20/34, 23/72
U.S. Cl. 34—9 40 Claims

1. A method for drying a catalytic absorbent, said method comprising contacting a catalytic absorbent comprising copper oxide supported on a calcined, amorphous, porous refractory oxide and containing accumulated water with a liquid hydrocarbon under conditions including a temperature from about 225° to about 400° F. and wherein the copper in said copper oxide is not reduced, and said contacting producing (1) a product catalytic absorbent containing less water than said catalytic absorbent prior to said contacting, and (2) an effluent liquid hydrocarbon containing a greater concentration of water than contained in liquid hydrocarbon prior to said contacting.

17. A method for drying a catalytic absorbent, said method comprising contacting a catalytic absorbent comprising copper oxide on a support comprising calcined gamma alumina and containing accumulated water with a liquid hydrocarbon comprising naphtha under conditions including a temperature from about 225° F. to about 400° F. and wherein said copper in said copper oxide is not reduced, and said contacting producing (1) a product catalytic absorbent containing less water than said catalytic absorbent prior to said contacting, and (2) an effluent liquid hydrocarbon containing a greater concentration of water than said liquid hydrocarbon prior to contacting.

26. A method for drying a catalytic absorbent, said method comprising contacting a catalytic absorbent comprising copper oxide on a support consisting essentially of a calcined, amorphous, porous refractory oxide and containing accumulated water with a liquid hydrocarbon under conditions including a temperature from about 225° F. to about 400° F. and wherein the copper in said copper oxide is not reduced, and said contacting producing (1) a product catalytic absorbent containing

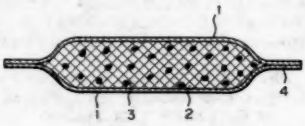
less water than said catalytic absorbent prior to said contacting, and (2) an effluent liquid hydrocarbon containing a greater concentration of water than contained in said liquid hydrocarbon prior to said contacting.

4,686,776

DEHYDRATING DEVICE

Mamoru Matsubara, Yokohama, Japan, assignor to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 28, 1986, Ser. No. 856,255
Claims priority, application Japan, Apr. 27, 1985, 60-89902
Int. Cl.[4] F26B *13/26*
U.S. Cl. 34—95 10 Claims



1. A dehydrating device comprising (1) a high osmotic pressure substance, (2) a polymeric water absorber and (3) a hydrophilic alcohol, wherein (1), (2) and (3) are integrally covered with a semipermeable membrane (4) allowing selective permeation of water.

4,686,777

PREVENTING SHEET FLUTTER IN PAPER WEB DRYERS

Ronald D. Cooke, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.

PCT No. PCT/US86/00374, § 371 Date Feb. 21, 1986, § 102(e) Date Feb. 21, 1986
PCT Filed Feb. 21, 1986, Ser. No. 878,834
Int. Cl.[4] F26B *13/08*
U.S. Cl. 34—116 2 Claims

2. For use in combination with a high speed dryer wherein a felt carries a paper sheet web over dryer rolls, and the felt forms an on-running tangent pocket with the perimeter of a dryer roll and into which pocket air is frictionally drawn by the on-running roll perimeter and felt tending to cause sheet web flutter:

a vacuum device comprising an elongate hollow manifold extending longitudinally within said pocket parallel to said felt and web, said manifold comprising a vacuum chamber defined between a pair of convergent wall panels, respective ones of said wall panels being in parallel spaced adjacency with the on-running felt, and in tangent spaced adjacency with the dryer roll;

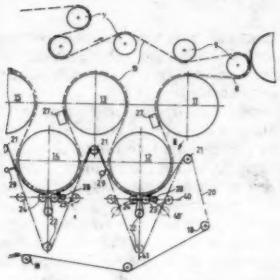
and opening means, including an array of vacuum ports in the wall panels, substantially throughout the length of the manifold for vacuuming said air from said pocket into the manifold, and further including a slit orifice formed at the convergence of the wall panels extending along the length of the manifold and in spaced adjacency with the pocket area of convergence of the on-running felt with the dryer roll, whereby the felt is rid of frictionally indrawn air over the surface of the adjacent wall panel, and air is withdrawn from the area over the dryer roll and from the pocket area of convergence of the on-running felt with the dryer roll.

4,686,778

DEVICE FOR THREADING A TRANSFER STRIP OF A PAPER WEB THROUGH THE DRYING CYLINDER SECTION OF A PAPER MACHINE

Gerhard Kotitschke, and Wilhelm Benz, both of Heidenheim, Fed. Rep. of Germany, assignors to J. M. Voith GmbH, Heidenheim, Fed. Rep. of Germany

Division of Ser. No. 676,546, Nov. 30, 1984, Pat. No. 4,610,097. This application May 27, 1986, Ser. No. 867,213
Claims priority, application Fed. Rep. of Germany, Dec. 7, 1983, 3344216
Int. Cl.[4] F26B *13/10*
U.S. Cl. 34—117 5 Claims



1. An apparatus for threading a transfer strip of a paper web through two successive drying cylinder groups of a paper machine wherein each of a first and second drying cylinder group includes at least one upper drying cylinder and at least one lower drying cylinder and an endless backing belt running alternately across the upper and lower drying cylinders of said group, said second drying cylinder group having one of said upper and lower cylinders as a first cylinder in proximity to said first drying cylinder group, which apparatus comprises:

an endless elongate guide member for guiding said transfer strip and coordinated with the first drying cylinder group to loop around portions of the drying cylinders in the first drying cylinder group, said guide member further loops around part of the first cylinder of the second drying cylinder group; and

a movable pulley means, which is movable between a first position and a second position, and arranged at the first cylinder of the second drying cylinder group, for carrying the first cylinder group guide member, said pulley means at said first position permits said guide member to loop around a part of said first drying cylinder and at said second position moves said guide member away from said first drying cylinder as to be spaced apart therefrom.

4,686,779

METHOD OF AND APPARATUS FOR PARTICULATE MATTER CONDITIONING

W. Gerald Wyatt, Arlington; Richard L. White, Dallas, both of Tex., and Jim Bleke, Wolcottville, Ind., assignors to VE Holding Corp., Arlington, Tex.

Continuation-in-part of Ser. No. 771,337, Aug. 30, 1985. This application Nov. 18, 1985, Ser. No. 799,014
Int. Cl.[4] F26B *17/14*
U.S. Cl. 34—168 21 Claims

1. An improved system for the conditioning of particulate

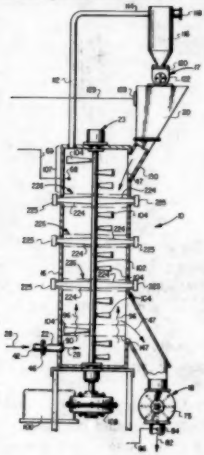
matter of the type wherein said particulate matter to be conditioned is exposed to treatment fluid within a vessel for select temperature and/or moisture level control, the improvement comprises:

a vertical vessel having side walls;

means for feeding particulate matter into an upper region of said vertical vessel for descending flow therethrough;

means for discharging said particulate matter from a lower region of said vessel;

means for injecting said treatment fluid into said vessel for mixture with said particulate matter; and



means for maintaining a generally vertical homogeneous counter-current flow between said particulate matter and said treatment fluid, said means for maintaining said flow including a plurality of paddles adapted for rotation through said particulate matter and a plurality of stators disposed between certain ones of said paddles to establish a plurality of swirling and counter-swirling notional mixing planes longitudinally along said vertical vessel for facilitating homogeneous interaction between said treatment fluid and said particulate matter.

4,686,780

MULTIDIRECTIONAL DYNAMIC FITTING SYSTEM FOR A SKI BOOT

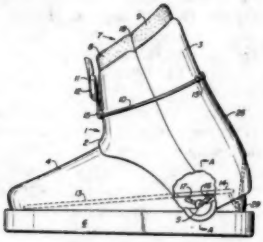
Richard G. Spademan, P.O. Box 6410, Incline Village, Nev. 89450

PCT No. PCT/US85/00215, § 371 Date Oct. 8, 1985, § 102(e) Date Oct. 8, 1985, PCT Pub. No. WO85/03416, PCT Pub. Date Aug. 15, 1985

PCT Filed Feb. 11, 1985, Ser. No. 789,304

Int. Cl.⁴ A43B *5/04*

U.S. Cl. 36—121 **20 Claims**



1. A sport shoe including a shell and cuff comprising means for tightening the fit of the shoe on a leg and foot in response to movement of the leg relative to the foot away from the normal position of the leg relative to the foot, the tightening means including a movable footbed and movable cuff.

4,686,781

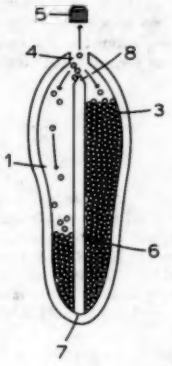
HOLLOWSHOE FOOTWEAR

Joseph R. Bury, 3029 54 Avenue North, St. Petersburg, Fla. 33714-2417

Filed May 6, 1985, Ser. No. 730,956

Int. Cl.⁴ A43B *5/00, 3/12;* **A63B** *23/04*

U.S. Cl. 36—132 **1 Claim**



1. A weighted hollowshoe footwear comprising

(a) rubber top, bottom, and sides,

(b) an inner chamber formed by said rubber top, bottom, and sides;

(c) a central rubber spline having an inverted V-shape tip at one end for allowing integral weighting material to migrate within said inner chamber,

(d) said central rubber spline being made integral with said hollowshoe footwear,

(e) a closure opening located at the front of said sides, and

(f) a means for closing said closure opening.

4,686,782

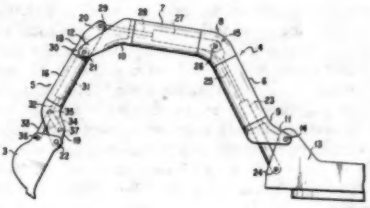
APPARATUS FOR OPERATING WORKING ELEMENT OF EXCAVATOR

Masatsugu Nagatomo, Komatsu, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Dec. 30, 1985, Ser. No. 814,434

Int. Cl.⁴ E02F *5/02*

U.S. Cl. 37—103 **7 Claims**



1. In an apparatus for the operation of a working element of an excavator provided with a boom, an arm connected at the rear end to the leading end of said boom and at the leading end thereof to said working element, a boom cylinder connected at one end thereof to said boom and adapted to impart a vertical rotary movement to said boom, an arm cylinder connected at

one end thereof to said boom and at the other end thereof to the rear end of said arm and adapted to operate said arm, and a working element cylinder connected at one end thereof to said arm and at the other end thereof to said working element and adapted to operate said working element, the improvement which comprises said boom and/or said arm being each fabricated in the shape of a hollow tube having the opposite ends thereof left unclosed and at least one cylinder selected from the group comprising said boom cylinder, said arm cylinder, and said working element cylinder being disposed as enclosed in said boom and/or said arm, the point of connection of said boom cylinder to said boom and the point of connection of said arm cylinder to said boom constituting a joint fulcrum, said joint fulcrum being formed in the central part of the bent portion of said intermediate boom member.

4,686,783

TAG FOR WILD GAME

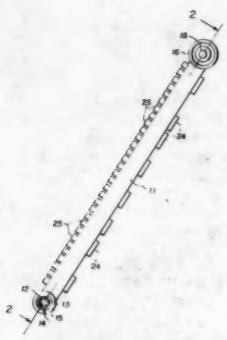
Pierre Bourquard, and Yves Bourquard, both of Boecourt, Switzerland, assignors to Biwi S.A., Switzerland

Filed Oct. 23, 1985, Ser. No. 790,322

Claims priority, application Switzerland, Feb. 6, 1985, 531/85

Int. Cl.[4] G09F *3/00*

U.S. Cl. 40—304 **5 Claims**



1. A tag for wild game, comprising a plastic resilient band having ends with complimentary means permanently attachable to one another, said complimentary means comprising on one end of said band and as an integral part thereof, a cylindrical female locking part, said female part being provided with an opening having a cylindrical bottom, a cylindrical metal insert in said bottom having an opening therein, a collar secured to said female locking part and having an inner portion overlying said insert, and on the other end of said band, and as an integral part thereof, a hollow element of a form complimentary to said cylindrical female locking part, said cylindrical female locking part being insertable into said hollow element and closely fitted within said hollow element, said hollow element having a bottom portion, and a metal male locking stem having a large diameter base embedded in said bottom portion of said hollow element and having a smaller diameter stem portion projecting upwardly from said base portion of said hollow element, said stem portion having a groove extending around its periphery, said stem portion penetrating into said insert and engaging said collar in the groove of said stem portion for retaining said hollow element to said female locking part.

4,686,784

DISPLAY DEVICE

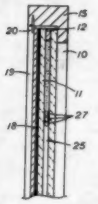
Graham Smithies, 17 Stocker Close Basingstoke, Hampshire, RG 213 HY, England

Filed Jul. 21, 1986, Ser. No. 887,712

Claims priority, application United Kingdom, Aug. 13, 1985, 8520247; Mar. 26, 1986, 8607468

Int. Cl.[4] G09F *19/00*

U.S. Cl. 40—406 **12 Claims**



1. A display device comprising

a flat sealed container comprising two substantially flat sheets of material supported in closely spaced relation and sealed together at their outer edges to provide a thin chamber,

one of said substantially flat sheets of material being substantially transparent, permitting viewing of said chamber therethrough,

a quantity of liquid substantially filling said chamber,

a small quantity of gas in said chamber sufficient to form bubbles therein upon agitation or inversion of said container,

said chamber having a thickness substantially the size of bubbles formed therein upon agitation or inversion of said container, and

a particulate material in said chamber in a quantity sufficient to fill a substantial fraction of the height of said chamber when said container is positioned vertically and freely movable to form decorative patterns as viewed through said substantially transparent flat sheet of material,

whereby after settling of the particulate material in the liquid in one direction upon positioning said container vertically, said container may be inverted vertically to cause bubbles of the gas to rise and form a bubble layer partially supporting the particulate material while allowing it to percolate downwardly between the bubbles to form a new and different decorative pattern.

4,686,785

DEVICE ADAPTED TO BE FIXED TO CRASH BARRIER GUARD RAIL

Antonio Obbermito, Turin, Italy, assignor to Ovas S.a.s. di A. Obbermito & C., Turin, Italy

Filed Jul. 19, 1985, Ser. No. 756,646

Claims priority, application Italy, Jul. 23, 1984, 53662/84[U]; Apr. 15, 1985, 53236/85[U]

Int. Cl.[4] G09F *15/00*

U.S. Cl. 40—606 **24 Claims**

1. Road sign device used for fitment to road side E-section guard rails of crash barriers, said E section having an upper convex part, comprising in combination:

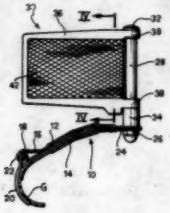
reflective flag,

a lateral support rod carrying said reflective flag, and

a lower fixing bracket carrying said support rod,

wherein said bracket comprises a strip of weather-resistant resilient material shaped substantially as a hairpin with extradotal and intradotal arms which have the same arcuate profile as the upper convex part of the guard rail to grip said upper part said extradotal arm including a free

end, an associated foot and screw means for fixing said foot to said, extradotal arms, said foot being curved to



embrace said upper convex part to prevent detachment of the bracket from the guard rail.

4,686,786

CARTRIDGE LOADING AND FEEDING ARRANGEMENT FOR EXPLOSIVE CHARGE OPERATED DEVICE

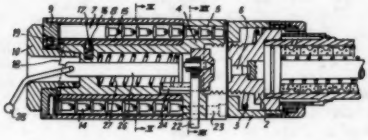
Pierre Termet, "Le Vieux Moulin" , 01820 Villebois, France

Filed Mar. 10, 1986, Ser. No. 837,728

Claims priority, application France, Mar. 8, 1985, 8503417

Int. Cl.[4] A22B *3/02*; F41C *25/10*

U.S. Cl. 42—1.12 **9 Claims**



9. A cartridge supply device for an apparatus having a barrel and a breech and operating by means of an explosive charge, and of the type in which, after unlocking the breech, the barrel can be pivoted with respect to the breech around an axis parallel to the barrel axis to a loading position in which a cartridge chamber of the barrel is aligned with a feed passage containing at least one cartridge, to feed a cartridge into the chamber from the passage, said cartridge supply device comprising an outer side wall located at the periphery of the breech and an inner side wall which is able to rotate around the breech defining an annular space around the periphery of the breech for containing a plurality of parallel lines of cartridges, said outer side wall being able to pivot with respect to the breech through an angle which corresponds to the angular distance between two lines of cartridges, elastic means retaining said inner side wall in a plurality of positions in each of which a line of cartridges is aligned with the feed passage and the cartridge chamber in the loading position, means for connecting said lines of cartridges to said inner side wall for rotation with said inner side wall, one way clutch means between said outer and inner sidewalls to drive said inner side wall in only one direction in response to alternating rotations of said outer side wall, said outer side wall providing means for gripping the apparatus at the breech so that the action of loading a cartridge into the breech causes manual rotation of the outer side wall to in turn rotate the inner side wall to align a different line of cartridges with the feed passage after each loading.

4,686,787

FISHING RODS

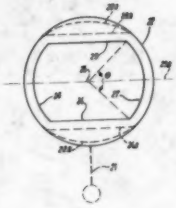
Nicolas P. L. Whipp, Penrhynmawr, Bwichtocyn, Pwllheli, Gwynedd LL53 7BU, Wales

Filed Feb. 21, 1986, Ser. No. 831,727

Claims priority, application United Kingdom, Feb. 28, 1985, 8505223; Mar. 9, 1985, 8506173; Feb. 3, 1986, 8602581

Int. Cl.[4] A01K *87/00*

U.S. Cl. 43—18.1 **10 Claims**



1. A fishing rod comprising one or more elongate sections, each such section having an integral cross-section shaped to reduce lateral bending during casting, which cross-section is hollow, the hollow being defined by upper and lower parallel inner surfaces connected by curved inner end surfaces which are concave inwardly, the outer surface of the cross-section having curved end faces which are convex outwardly and connected by upper and lower faces which are curved over at least substantial parts of their extents outwardly of said parallel inner surfaces.

9. A fishing rod comprising at least one elongate section, each such section being of integral radial cross-section integrally formed of substantially the same material or materials throughout the cross-section, the cross-section being hollow, the hollow being defined by upper and lower parallel opposed inner surfaces intersecting with and connected by opposed inwardly concave curved inner end surfaces, the outer surface of the cross-section having outwardly convex curved end faces connected by upper and lower faces which are curved over at least substantial parts of their extents outwardly of said parallel inner surfaces.

4,686,788

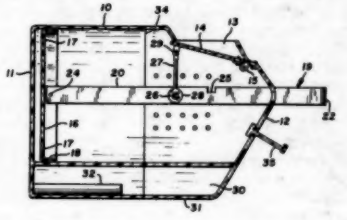
MINNOW BUCKET

Robert D. Hartman, 1000-74th Ave. North, Brooklyn Park, Minn. 55444

Filed Oct. 30, 1986, Ser. No. 925,074

Int. Cl.[4] A01K *97/04*

U.S. Cl. 43—56 **16 Claims**



1. A minnow bucket comprising:

(A) an elongated substantially cylindrical housing closed at its opposite ends,

(B) a door opening in one side of the housing,

(C) a generally circular perforated lift plate within said housing parallel to the bottom end wall thereof,

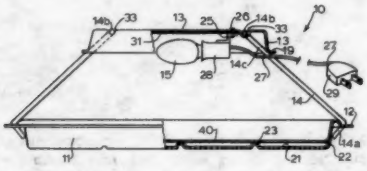
(D) a handle secured to said lift plate and extending through the top end wall of the housing,
(E) a door on the inside of said door opening hinged along the top edge of the opening,
(F) link means between said door and said handle whereby raising of the handle and lift plate opens the door, and
(G) latch means for holding the handle in raised position.

4,686,789

INSECT TRAP

Clarence O. Williams, 3617 Sheffield Dr., Rocky Mount, N.C. 27801

Filed Dec. 12, 1986, Ser. No. 941,738
Int. Cl.[4] A01M *1/04*
U.S. Cl. 43—113 **5 Claims**



1. A trap for catching insects, comprising:
(a) a rectangular shallow pan having and supported by a substantially flat bottom wall enabling said pan to be accessible to a source of insects to be trapped and having formed edge portions on each of two opposed upstanding side walls thereof with spaced apart pairs of holes formed in each respective edge portion;
(b) a sticky substance disposed in said pan and providing a sticky landing surface above said bottom wall for live insects to be trapped and killed;
(c) a rectangular cover of selected color having within downwardly extending sidewalls a light reflective horizontal bottom surface of selected color and at each end thereof a spaced apart pair of holes extending through said surface with each respective pair of holes being located in a downwardly extending groove formed in said cover above said bottom surface and extending widthwise thereof;
(d) support means comprising a pair of wire-formed leg members, each said wire-formed leg member having a central portion resting against the top surface of said cover in a respective said groove and leg portions extending from opposite edges of said central portion downwardly through a selected pair of said holes in said cover, each said leg portion having an intermediate portion formed to rest against a lower sidewall surface of said cover, downwardly extending legs, the lower end of each said leg being formed to pass through a respective hole in a respective said edge portion and grasp a respective said shallow pan formed edge such that when said legs are spread apart said intermediate portions bear against lower sidewall surfaces of said cover and said lower ends are detachably fixed in position and tend to resiliently grasp those portions of said shallow pan formed edge portion around the holes in which the respective lower ends reside to thereby support said cover in vertically-spaced and predetermined fixed relation over said pan with said light reflective surface opposing the bottom wall of said pan and located to provide open unobstructd space between said cover and pan to permit said insects to jump through said space into said pan to contact said sticky landing surface; and
(e) an electrically energized visible light source of selected color, said light source being secured to said cover below said light reflective surface thereby generating and exposing to the insects sought to be trapped both reflected downwardly transmitted light and downwardly and outwardly transmitted directly radiated light mixed with said reflected light from said source.

4,686,790

DEGRADABLE AGRICULTURAL PLASTIC ARTICLES, E.G., MULCHING FILM, COMPRISING SLOWLY RELEASED MULTINUTRIENTS IN MATRIX OF THERMOPLASTIC, AND PROCESS FOR PREPARING SAME

Shawqui Lahalih, Rique; Saed-el-Deen Akashah, and Farouk Al-Hajjar, both of Jabriaya, all of Kuwait, assignors to Kuwait Institute for Scientific Research, Safat, Kuwait

Filed Oct. 29, 1985, Ser. No. 792,656
Int. Cl.[4] A01G *7/00*
U.S. Cl. 47—9 **43 Claims**

1. A self-supporting, composite, degradable agricultural mulch film, which comprises:
(a) a first film formed from a water-soluble synthetic resin and having admixed therein at least one releasable form of nitrogen, at least one releasable plant nutrient in addition to nitrogen, and at least one agent which functions to slow the release of nitrogen from said first film; and
(b) a second film formed as an adherent coating on said first film, said second film comprising a water-resistant synthetic resin, said second film functioning to retard the degradation rate of the composite mulch film, to further slow the rate of release of said nitrogen, and to slow the rate of release of said plant nutrient other than nitrogen.

4,686,791

AGRICULTURAL FILM STRUCTURE

Shigeo Miyata, Takamatsu, Japan, assignor to Kyowa Chemical Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 755,588, Aug. 21, 1985, which is a division of Ser. No. 670,599, Nov. 13, 1984. This application Nov. 24, 1986, Ser. No. 935,085
Claims priority, application Japan, Nov. 12, 1983, 58-211697
Int. Cl.[4] A01G *13/04*; C08K *3/10*
U.S. Cl. 47—29 **4 Claims**

1. In a method for growing cultivated plants which comprises covering the locus where the cultivated plants are grown or are to be grown with an agricultural film structure, the improvement comprising the step of covering said locus with a film structure comprised of a mixture of
(a) 100 parts by weight of a thermoplastic resin and
(b) about 1 to about 20 parts by weight of a hydrotalcite powder, as an infrared radiation absorbing powdery inorganic compound, having an average secondary particle diameter of not more than about 5 microns and a BET specific surface area of not more than about 30 m^2/g and being represented by the following formula (1)

$$M_{1-x}^{2}Al_x(OH)_2(A^{n-})_{x/n}.mH_2O \quad (1)$$

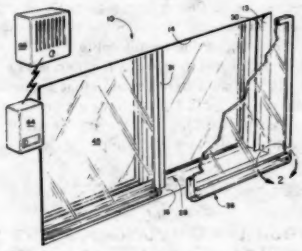
wherein M^{2+} represents a divalent metal ion selected from the group consisting of Mg, Ca and Zn ions, A^{n-} represents an anion having a valence of n, and x and m satisfy the following conditions
$0<x<0.5$
$0 \leqq m \leqq 2$,
thereby improving visible light availability and heat retention for said cultivated plants.

4,686,792

COMBINATION STORM WINDOW AND SECURITY SYSTEM

Barbara C. Terrian, 370 Coogan Way, El Cajon, Calif. 92020

Filed Mar. 3, 1986, Ser. No. 835,168
Int. Cl.[4] E04B 65/04
U.S. Cl. 49—61 3 Claims



1. A combination storm window and security system comprising:

a house window frame opening having a rectangular configuration formed from a pair of laterally spaced vertically extending window frame members, a header connecting the top ends of said window frame members and a window sill connecting the bottom ends of said window frame members;

a rectangularly shaped aluminum window frame fixedly mounted in said window frame opening, said aluminum window frame having a pair of laterally spaced vertical channels connected at their bottom ends by a horizontal track channel, a sliding window panel mounted in said horizontal track channel, a stationary window panel laterally offset from said horizontal track channel and being rigidly secured to said aluminum window frame;

said window frame opening having an exterior side and an interior side, a pair of vertical sheet metal brackets offset toward the interior side of said window frame opening from said aluminum window frame, said vertical sheet metal brackets being rigidly attached to the respective vertically extending window frame members;

a vertical support member having its bottom end rigidly attached to the window sill and its top end rigidly attached to said header, said vertical support member being positioned approximately midway between said vertical sheet metal brackets;

a pair of storm windows having an exterior side and an interior side;

magnetic means for detachably securing said storm windows to said vertical sheet metal brackets and said vertical support members;

a wide gap magnetic switch having two separate components, the first one of said components being mounted on one of said storm windows adjacent one of its edges and the second of said components being located in said window frame, said second component being connected to a security alarm system; and

said storm windows having a channel formed on their interior side along their bottom edge, said channel functioning as a fingergrip flange and also as a housing for supporting the first component of said wide gap magnet.

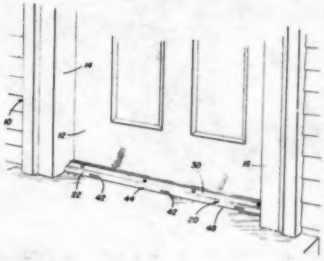
4,686,793

THRESHOLD

Norman J. Mills, 820 Aspen Rd., West Palm Beach, Fla. 33409

Filed Jun. 23, 1986, Ser. No. 877,306
Int. Cl.[4] E06B 1/70
U.S. Cl. 49—471 3 Claims

1. A threshold including an elongated horizontal body defining longitudinal inner and outer side portions disposed on opposite sides of a central upstanding longitudinal plane extending longitudinally of said body and defining inner and outer side extremities extending along said threshold, said body including high and low outer and inner side portion upper surfaces and a generally upright surface extending betweeen said high and low upper surfaces, facing generally horizontally toward said inner side extremity and including upper and lower margins, said upper surface, adjacent said upright surface, being transversely inclined downwardly toward the lower margin of said upright surface, said outer side portion defining transverse inclined drain passage means therein including upper and lower ends, said passage means upper end opening upwardly through the lower margin of said upright surface at points spaced longitudinally therealong and said lower end of said passage means opening downwardly through said outer side extremity at points spaced therealong, the upper portion of said upright surface including seal strip means extending longitudinally therealong at an elevation above the uppermost portion of said inner portion upper surface and



facing outwardly of said upright surface, said upper margin of said upright surface including an outwardly opening groove formed therein, said seal strip means including an elongated seal strip having a transversely enlarged base portion captively retained in said groove, said inclined lower upper surface terminating upwardly in a transversely downwardly curved inner marginal portion of said body defining said inner side extremity, an upright door including inner and outer surfaces and a lower margin terminating downwardly at a downwardly facing lower edge extending between said surfaces, said door being mounted relative to said threshold for horizontal swinging between an open position and a closed position with the outer surface of said door lower margin closely opposing said upright surface and compressively engaging said seal strip means and said lower edge closely overlying said inner side portion upper surface, said lower edge including a depending resilient seal strip supported therefrom intermediate said inner and outer surfaces and sealingly engaging said downwardly curving surface centrally intermediate the arc ends thereof when said door is in the closed position thereof.

4,686,794

STONE GUIDE FOR A SUPERFINISHING MACHINE

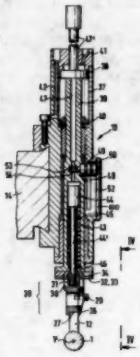
Robert Weber, Zeil, and Anton Memmel, Aidhauser, both of Fed. Rep. of Germany, assignors to Supfina Maschinenfabrik Hentzen GmbH & Co., Fed. Rep. of Germany

Filed Apr. 5, 1985, Ser. No. 720,436
Claims priority, application Fed. Rep. of Germany, May 5, 1984, 3412751
Int. Cl.[4] B24B 33/04
U.S. Cl. 51—59 R 8 Claims

1. A stone guide for a superfinishing machine for superfinishing the outer cylindrical surface of a workpiece rotatable about its axis, the superfinishing machine including a supporting member vibrating parallel to the outer cylindrical surface of the workpiece, the stone guide comprising:

a housing mounted to the supporting member;

a first piston movable within said housing in a direction normal to the axis of the workpiece;
an elongated tubular member connected to said first piston for movement within said housing, said elongated tubular member defining a cylindrical bore;
means connected to said elongated tubular member and defining a contact surface;
a second piston movable within said cylindrical bore;
a clamping element connected to said second piston, said clamping element defining a first shoulder;
a honing stone;
honing stone holding means for holding the honing stone, said honing stone holding means defining a contact surface and a second shoulder;



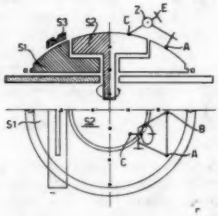
first pressure means for pressing said first shoulder against said second shoulder to clamp the honing stone holding means in a fixed relation with said first piston;
second pressure means for supplying a pressurized medium to said second piston to act against said first pressure means from its connection to said first piston by said clamping element; and
third pressure means for supplying a pressurized medium to said first piston to press the unit comprising the first piston, the second piston, the honing stone holding means and the honing stone against the outer cylindrical surface of the workpiece.

4,686,795

PRINCIPLES AND APPLIANCES FOR CUTTING OF SPHERICAL-FACETED GEMS AND GEMS THUS OBTAINED

Giovanni Colliva, Rua Tenente Azevedo, 104 - Sao Paulo, Brazil

Continuation of Ser. No. 527,091, Aug. 29, 1983, abandoned.
This application Feb. 12, 1986, Ser. No. 829,460
Claims priority, application Italy, Sep. 16, 1982, 41011 A/82; Aug. 3, 1983, 22408 A/83
Int. Cl.[4] B24B *13/02*
U.S. Cl. 51—125 **1 Claim**



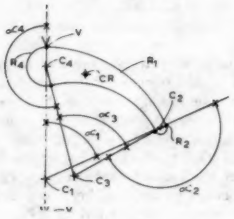
1. Apparatus for lapping a gem to form spherical facets thereon, said apparatus comprising a rotatable abrasive lapping tool having a sphere-shaped working surface, gem holding means for holding a gem in contact with said sphere-shaped working surface of said lapping tool, a fixed support member having an annular sphere-shaped support surface surrounding and coaxial with said tool for supporting said gem holding means, the radii of said sphere-shaped working surface of said lapping tool and of said sphere-shaped support surface of said support member being finite and substantially equal, and guide means movable over and in contact with said sphere-shaped support surface, said guide means being rigidly connected to said gem holding means to move said gem holding means over said lapping tool in such an orientation that a spherical facet in contact with the tool will always have a common center with the sphere-shaped working surface of the tool, said guide means movably contacting said support surface at only two spaced points.

4,686,796

METHOD AND APPARATUS FOR IMPROVED POLISHING OF TURBINE BLADES

Karl-Heinz Giebmanns, 1 Ledgemoor La., Westport, Conn. 06880

Filed Jun. 20, 1986, Ser. No. 876,809
Int. Cl.[4] B24B *5/00*; B21K *1/20*; B23P *13/00*
U.S. Cl. 51—144 **5 Claims**



1. An apparatus for polishing the surface of a turbine blade comprising a sanding belt mounted for rotation on a shoe, and a workpiece holder mounted on a movable platform,
said shoe having an axis of rotation movable in a vertical direction, and said platform being movable in two mutually perpendicular directions in a horizontal plane,
means for moving said shoe axis in a vertical direction and means for moving said platform in two mutually perpendicular directions in a horizontal plane,
said workpiece holder comprising a spindle having an axis parallel to one of said directions in said horizontal plane, whereby said workpiece is rotatable about said spindle axis and movable in a horizontal plane, and
means for synchronizing the movement of said shoe and said platform and the rotation of said spindle.

4,686,797

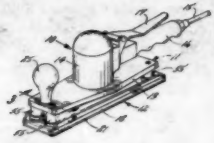
STRAIGHT-LINE RUBBING MACHINE WITH THRUST TRANSMITTING MEMBERS

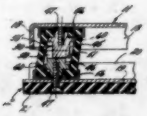
Roger T. Hoffman, Monroe Center, Ill., assignor to National Air Sander, Inc., Rockford, Ill.

Filed Oct. 15, 1986, Ser. No. 918,994
Int. Cl.[4] B24B *23/00*
U.S. Cl. 51—170 TL **12 Claims**

1. A rubbing machine having, in combination, a rubbing shoe, a rigid support spaced from and overlying the shoe, a drive mechanism connected between said shoe and said support and operable to move the shoe back and forth relative to the support, hollow and flexible boot means spaced angularly from one another around the drive mechanism, vertically stiff transmitting means housed within each of said boot means and

connected between the support and the shoe for transmitting thrust between the support and the shoe, said thrust transmitting means including means for confining back and forth movement of said shoe to a straight path during operation of said drive mechanism.



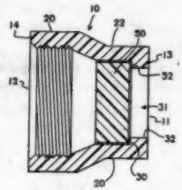


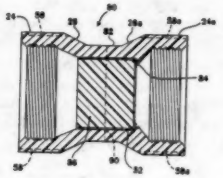
4,686,798

OPTICAL BLANK CARRIER FOR LATHING LENSES AND PROCESS THEREFOR

Dean M. Petty, Mesa, and Howard M. Sage, Phoenix, both of Ariz., assignors to Sola U.S.A. Inc., Phoenix, Ariz.

Filed Jun. 21, 1985, Ser. No. 747,484
Int. Cl.[4] B24B *41/06*
U.S. Cl. 51—216 LP **11 Claims**





1. A lens preparation system including:

(A) a carrier reversibly mountable in a turning lathe chuck and subject to be machined coaxially with an axis of rotation of a chuck in which it is mounted, said carrier being adapted to support an optical blank during the process of machining both faces of the optical blank with the turning lathe to form a lens having a posterior curve and an anterior curve without the necessity for removing the optical blank from said carrier intermediate the machining process, said carrier comprising:

(1) a one-piece body formed from a material which has machining characteristics similar to the machining characteristics of the material from which the optical blank is formed; said body having:

(a) a first end;

(b) a second end;

(c) an outer surface; and

(d) an opening therethrough extending between said first and second ends and defining an inner surface;

(2) blank positioning means proximate said second end for accepting and defining the position of an optical blank inserted into said body through said first end; and

(3) first retaining means for securing the optical blank within said body at said blank positioning means during the process of machining the posterior curve from the optical blank;

(B) means extending into said opening from said first carrier end for machining a posterior curve from a first face of the optical blank while it is mounted in said carrier and said carrier is mounted in a first turning lathe chuck;

(C) means for machining a reference/mounting surface from said outer surface such that said reference/mounting surface is coaxial with the axis of said posterior curve;

(D) second retaining means introduced into said opening at said first end after said posterior curve has been machined, said second retaining means being adapted to fix the position of said lens blank by engaging and juxtaposing said posterior curve and said inner surface;

(E) means for subsequently mounting said carrier in a second turning lathe chuck, said second turning lathe chuck engaging said reference/mounting surface; and

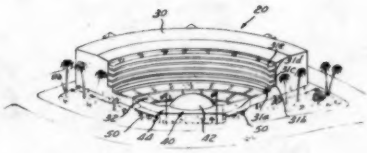
(F) means for thereafter concurrently machining an anterior curve from a second face of the optical blank and at least a portion of said carrier contiguous with said optical blank such that the axis of said anterior curve is coaxial with said reference/mounting surface.

4,686,799

THEATRE STRUCTURE WITH INDIVIDUAL MULTIPLE LOUNGES

John P. Kwake, 2507 Carob Dr., Los Angeles, Calif. 90046

Filed Mar. 17, 1986, Ser. No. 840,046
Int. Cl.[4] E04H *3/10*
U.S. Cl. 52—8 **16 Claims**



1. A theatre structure which comprises:

a permanent outdoor stage area;

a plurality of tiered rows of individual seating having unobstructed sight lines to said stage area at least some of said individual seating being open-air seating;

a plurality of tiered rows of individual suites, each individual suite being provided with seating areas and non-seating areas situated above and to the rear of said tiered rows of individual seating, each of said individual suites having unobstructed sight lines to said permanent outdoor stage area and each of said individual suites having means for completely enclosing each of said individual suites, and for opening each of said individual suites to said stage area;

a first entrance to said plurality of rows of individual seating; and

a second separate lobby entrance leading to said plurality of individual suites.

4,686,800

GEOMETRIC CONSTRUCTION SYSTEM AND METHOD

Donald M. McCormick, 3311C N. O'Henry Blvd., Greensboro, N.C. 27405

Filed Jan. 29, 1986, Ser. No. 823,701
Int. Cl.[4] E04B 1/32
U.S. Cl. 52—81 23 Claims

1. A method of assembling a geometrical structure comprising the steps of:

(1) generating a first cellular frame of strut members to represent an imaginary solid geometric tetrahedron, said generation of said cellular frame comprising the substeps of:

(a) connecting together three struts to represent a first planar face of said imaginary tetrahedron, said three struts each having first ends thereof connected together at an interior point of said first planar face and second ends positioned to define intermediate vertex points along respective edges of said imaginary tetrahedron;

(b) repeating substep (a) for each of second, third, and fourth planar faces comprising said imaginary tetrahedron in a manner whereby second ends of said struts for each face are positioned to be connectable at corresponding vertex points to second ends of struts in neighboring faces, said vertex points being located at respective edges of said imaginary tetrahedron whereat dihedral angles are formed by neighboring planar faces; and,

(c) connecting second ends of said struts for each face to second ends of struts in neighboring faces at corresponding vertex points to form the first cellular frame; and,

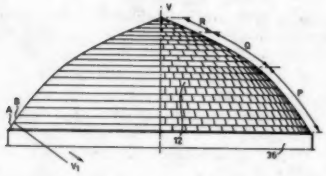
(2) generating a plurality of further cellular frames whereby each cellular frame shares at least one vertex point with another cellular frame, said further cellular frames being generated in accordance with step (1).

4,686,801

ROOF STRUCTURE

Lars Eriksson, Port Hope, Canada, and Brian V. Knight, New Hartford, N.Y., assignors to Orfus Limited, Freeport, The Bahamas

Filed Jul. 29, 1986, Ser. No. 891,474
Int. Cl.[4] E04B 1/32
U.S. Cl. 52—81 13 Claims



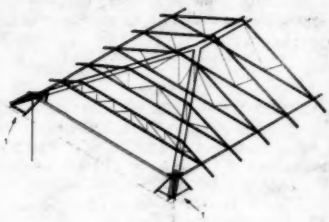
1. A self supporting roof structure comprising: a plurality of vertically-adjacent, upwardly and inwardly inclining, at least partial rings stacked one on another; each ring being generally circular and comprised of a plurality of horizontally-adjacent similar panels each of which is an aliquot of the ring; each panel having an outer surface which is convex from side to side, upwardly converging rectilinear sides, a concave top plate member, and a convex bottom plate member; said top and bottom plate members in each ring defining upper and lower conical surfaces which slope inwardly and downwardly wherein the apex of said conical surfaces coincides with the axis of the roof structure; and each panel being disposed with its sides laterally staggered with respect to the sides of the panels in the rings above and below.

4,686,802

STRUCTURAL MEMBER

Bryan E. O'Driscoll, Mayne, Australia, assignor to Nu-Steel Engineering Pty. Ltd., Mayne, Australia

Filed May 12, 1986, Ser. No. 862,106
Int. Cl.[4] E04B 7/00, 7/12
U.S. Cl. 52—94 8 Claims



1. A support assembly for a corner of a roofing structure, said support assembly comprising:

a rectangular frame having a pair of substantially triangular planar sub frames, each said sub frame being in the form of a right isosceles triangle, the hypotenuse side of each triangular sub frame abutting to form a diagonal intersection across said rectangular frame, said hypotenuse of each triangular sub frame combining in use to form a hip rafter and an adjacent side of each triangular sub frame forming a rafter element disposed at 90 degrees relative to each other; and,

mounting means associated with one end of said hip rafter element to support said one end above an opposed end of said hip rafter whereby said planar triangular sub frames are tilted relative to each other along said diagonal intersection to co-operate with adjacent planes of a roof structure, said triangular sub frames each including a connecting member between and adjacent divergent ends of said hypotenuse side and said adjacent side.

4,686,803

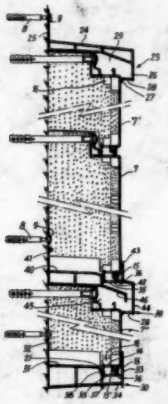
CLADDING ELEMENT FOR OUTER FACADES, AND APPLICATION THEREOF

Pierre Couderc, Neuilly sur Seine, and Henri Corbel, Saint Brevin, both of France, assignors to Elf Isolation, Paris, France

PCT No. PCT/FR84/00040, § 371 Date Oct. 29, 1984, § 102(e) Date Oct. 29, 1984, PCT Pub. No. WO84/03320, PCT Pub. Date Aug. 30, 1984
PCT Filed Feb. 27, 1984, Ser. No. 677,545
Claims priority, application France, Feb. 28, 1983, 83 03228
Int. Cl.[4] E04D 3/368, 13/16; E04B 1/70
U.S. Cl. 52—97 35 Claims

1. A cladding element for providing a wall with an outer facade, comprising a central band having flanges extending from opposite edges thereof, wherein each of said flanges extends from said central band on the same side of the plane of

said central band, and wherein each of said flanges includes a row of venting holes and connection means comprised of a single ratchet blade protruding outwardly from the flange and



adapted for interlocking connection with the single ratchet blade of a corresponding, adjacent cladding element to be connected to said cladding element.

4,686,804

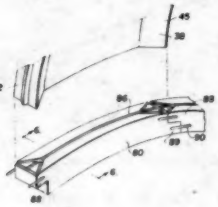
PREFABRICATED PANELIZED NUCLEAR-HARDENED SHELTER

Randley A. Smith, 1608 Bessemer, El Paso, Tex. 79936

Filed Oct. 5, 1983, Ser. No. 539,236

Int. Cl.[4] E02D *27/00*

U.S. Cl. 52—169.6 **39 Claims**



1. A shelter for protecting occupants therein from dynamic blast waves and barometric overpressure created by an above ground nuclear detonation proximate to said shelter,

said shelter being buried below ground under soil, said soil comprising means for the attenuation of the dynamic blast wave generated by the detonation,

said shelter having a semipherical domed roof and a base means supporting the roof, said semipherical domed roof being downwardly displaceable and having a lower edge which is vertically and downwardly movable in response to barometric overpressure generated by the detonation,

said base means being a ring made up of a plurality of arcuate sections, said arcuate sections of said base means being crushable in response to the vertical downward movement of the roof to enable the roof to move downwardly to a lower position where it is supported on the crushed base member, said overpressure being transmitted through the soil surrounding said roof.

4,686,805

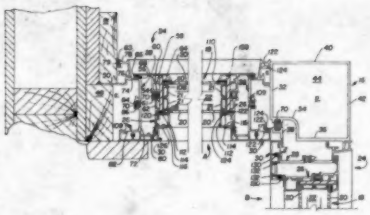
PANEL SUPPORT

Gary L. Forslin, Johnson City, Tenn., assignor to Jurl Extrusions, Inc., Elizabethton, Tenn.

Filed Feb. 21, 1985, Ser. No. 703,993

Int. Cl.[4] E06B *3/00*

U.S. Cl. 52—208 **32 Claims**



1. A panel support comprising sash means having wall means adapted to be spaced outwardly from and substantially encircling the periphery of panel means, shoulder means adapted to contact and retain said panel means in position within said sash means with said wall means in spaced relationship to said panel means periphery, the width of said wall means adapted to extend generally perpendicular to the plane of said panel means and for a distance at least substantially the thickness thereof, primary thermal break means in said wall means extending substantially the length thereof, mounting means for securing said sash means to a building, shroud means adapted to lie adjacent portions of either one or both edges of said wall means and mounting means and having surfaces spaced from said portions to provide dead-air, secondary thermal break means, and a glazing bead forming part of said shroud means and adapted to retain said panel in position.

4,686,806

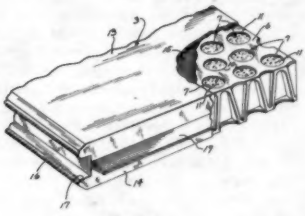
MOLDED HIGH IMPACT INDUSTRIAL DOOR

Mark A. Bennett, Milwaukee, Wis., assignor to Kelley Company Inc., Milwaukee, Wis.

Filed Feb. 6, 1986, Ser. No. 826,761

Int. Cl.[4] E04C *1/00*

U.S. Cl. 52—309.4 **16 Claims**



1. An impact resistant industrial door, comprising a honeycomb core formed of thermoplastic resin and having a pair of opposed faces and having edges connecting said faces, said core having a multiplicity of cells with each cell having an open end and having a closed bottom, the open ends of a first group of said cells being located on one face and the open ends of a second group of said cells being located on the opposite face, a lightweight resilient flexible material filling said cells and extending to said open ends, an elastomeric resin encapsulating said core and being bonded to said faces and said edges and to said material exposed in the open end of said cells, said core having a plurality of holes extending between said faces

and intersecting said cells, and said elastomeric resin extending through said holes.

4,686,807

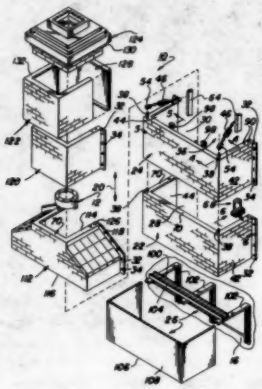
STRUCTURALLY REINFORCED, PRE-FABRICATED AND MODULAR CHIMNEY FACADE SYSTEM

R. Wayne Newsome, P.O. Box 39, Columbia, Md. 21045

Continuation-in-part of Ser. No. 666,761, Oct. 31, 1984, Pat. No. 4,593,510. This application May 29, 1986, Ser. No. 868,090

Int. Cl.[4] E04C *1/00*

U.S. Cl. 52—314 **31 Claims**



1. A structurally reinforced, pre-fabricated and modular chimney facade system being adapted to be fixedly secured to an external wall of a building structure, comprising:

(a) a chimney stack passing external said building structure and being enclosed by said chimney facade system;

(b) a first one-piece base housing fixedly secured to a base foundation being positionally located external and adjacent said building structure and an external surface of said external wall, said first one-piece base housing defining a first through passage having a cross-sectional area greater than a cross-sectional area of said chimney stack;

(c) at least a second one-piece base housing removably mountable and fixedly securable to said first one-piece base housing and said external wall of said building structure, said second one-piece base housing defining a second through passage having a cross-sectional area substantially equal to said cross-sectional area of said first through passage of said first one-piece base housing at an interface of said first and second one-piece base housings; and,

(d) means for structurally supporting said first and second one-piece base housings to said external wall of said building structure, said structural supporting means including means for adjustably applying a force loading between said external wall of said building structure and at least one of said first and second one-piece base housings within said first or second through passage.

4,686,808

ROOFING SYSTEM, METHOD AND HOLDDOWN APPARATUS

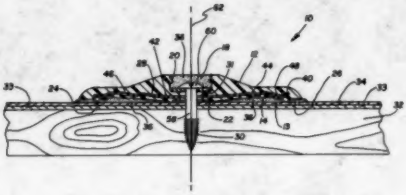
Carol J. Triplett, Huntertown, Ind., assignor to John D. Gray, Avilla and Charles S. Triplett, Ft. Wayne, both of, Ind.

Filed Mar. 14, 1983, Ser. No. 475,159

Int. Cl.[4] E04B *5/00*

U.S. Cl. 52—410 **17 Claims**

1. A holddown to be used in conjunction with a headed fastener, said holddown comprising a circular spring having an aperture and upper and lower edges, said upper edge surrounding said aperture, a circular body encasing said spring, said body having an upper surface and a lower surface, said body having a hole concentric with said aperture, said hole and aperture being of a size sufficient to permit the interpositioning of the shaft of a headed fastener therein with said head bearing upon said upppr surface adjacent to said upper edge of said spring, said spring being deformable from an unbiased position to a biased position by a compressive force applied at said upper edge in a direction from said upper edge toward said lower edge by said fastenr said body being deformable from an



unconstrained shape to a constrained shape with said deformation of said unbiased position to said biased position, said spring having central and outer portions, said central portion adjoining said upper edge, said central portion having an annular shape concentric with said aperture, said spring outer portion being between said central portion and said lower edge, said outer portion also having an annular shape concentric with said aperture, said central portion being above said outer portion when said spring is in said unbiased position.

4,686,809

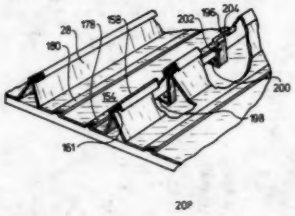
METHOD AND APPARATUS FOR ROOFING

Lawrence Skelton, 101 Harris Ln., Springdale, Ark. 72764

Filed Nov. 8, 1984, Ser. No. 669,471

Int. Cl.[4] E04D *1/00*

U.S. Cl. 52—528 **4 Claims**



1. An elongated roofing member for the construction of a roof for a structure, said elongated roofing member comprising:

(a) an elongated flat central portion;

(b) an elongated male flange extending from one edge of said elongated flat central portion, said elongated male flange comprising a first elongated portion extending angularly outwardly and upwardly from said elongated flat central portion and a second elongated portion extending angularly upwardly from said first elongated portion generally in the direction toward the area above said elongated flat central portion; and

(c) an elongated female flange extending from the opposite edge of said elongated flat central portion, said elongated female flange comprising a first elongated portion extending angularly outwardly and upwardly from said elongated flat central portion, a second elongated portion extending angularly upwardly from said first elongated portion generally in the direction toward the area above said elongated flat central portion, a third elongated portion extending angularly upwardly from said second elongated portion generally in the direction away from the area above said elongated flat central portion, and a fourth elongated portion extending angularly downwardly from

said third elongated portion generally in the direction away from the area above said elongated flat central portion, said second, third and fourth elongated portions of said elongated female flange defining an elongated channel for receiving a second elongated portion of an elongated male flange of an adjacent elongated roofing member, said fourth elongated portion of said elongated female flange being deflectable such as to crimp the second elongated portion of the elongated male flange of the adjacent elongated roofing member between said third and fourth elongated portions of said elongated female flange to engage the elongated male flange of the adjacent elongated roofing member with said elongated female flange for interconnection of adjacent elongated roofing members.

4,686,810

METHOD FOR LEAKPROOFING BUILDING WALLS, AS WELL AS INSERTION ELEMENT FOR IMPLEMENTING THE METHOD

István Jancsovics, 65. Kossuth u., 8651 Balatonszabadi, Hungary

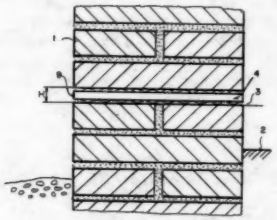
PCT No. PCT/HU83/00035, § 371 Date Feb. 28, 1985, § 102(e) Date Feb. 28, 1985, PCT Pub. No. WO85/00395, PCT Pub. Date Jan. 31, 1985

PCT Filed Jul. 1, 1983, Ser. No. 723,966

Claims priority, application Hungary, May 27, 1982, 1705/82

Int. Cl.[4] E04B *1/62*

U.S. Cl. 52—743 **2 Claims**



1. A method for the subsequent leakproofing of building walls, comprising cutting a slot through a building wall at the site of the desired leakproofing, then inserting in said slot a grid-like insertion element comprising a carrier lattice having load-bearing balls arranged in a grid pattern, upper and lower portions of the balls projecting beyond the carrier lattice, and injecting a material having leakproofing and setting properties into the slot to embed the insertion element and the balls therein.

4,686,811

Patent Not Issued For This Number

4,686,812

ROTATIONAL SPHERE PRESS FOR AGRICULTURAL GRAIN STEM PRODUCTS

Dirk Bruer; Karl-Heinz Tooten, and Theo Freye, all of Harsewinkel, Fed. Rep. of Germany, assignors to Claas OHG, Harsewinkel, Fed. Rep. of Germany

Filed Jul. 19, 1985, Ser. No. 756,663

Claims priority, application Fed. Rep. of Germany, Jul. 21, 1984, 3426965

Int. Cl.[4] B65B *11/04*

U.S. Cl. 53—118 **12 Claims**

1. A press for harvested agricultural grain stem products comprising:

(a) a wrapping zone

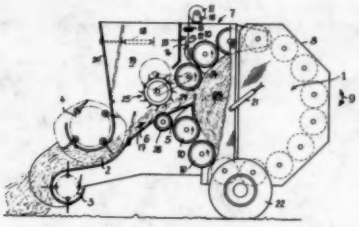
(b) a prechamber located upstream to said wrapping zone;

(c) a plurality of conveyor rollers located at the periphery of said wrapping zone;

(d) a feed entryway formed between two of said conveyor rollers for communication between said prechamber and said wrapping zone;

(e) a first conveyor means for conveying the harvested product into said prechamber from outside the press;

(f) a second conveyor means for transporting said harvested product from said prechamber through said feed entryway into said wrapping zone, said second conveyor means comprising a conveyor drum having a plurality of prongs, and a movable reset member for providing at least at times pressing force between said harvested product and said



conveyor drum, means for intermittently rotating said drum to feed said product and for stopping said drum to blockoff the entry of said product into said wrapping zone while a previous product is being wrapped; wherein said drum is axially parallel to said conveyor rollers, said press further comprising a counter-bearing member located opposite said conveyor drum relative to the path of the product, wherein said drum can be shifted by overcoming said pressing force of said reset element perpendicular to said counter-bearing within a given path of motion.

4,686,813

ROBOT SYSTEM FOR ENCASING CONE-LIKE ARTICLES

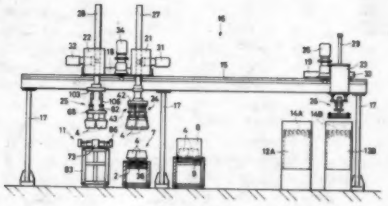
Morio Sawada, Kako, Japan, assignor to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Mar. 5, 1986, Ser. No. 836,340

Claims priority, application Japan, Mar. 11, 1985, 60-48747

Int. Cl.[4] B65B *35/36, 35/58*

U.S. Cl. 53—446 **14 Claims**



1. A robot system for encasing cone-like articles, the system comprising:

a robot movable along a path,

an aligning and supplying device for aligning and supplying a plurality of cone-like articles along the path of the robot, and

an inverting device for carrying and inverting said plurality of cone-like articles which are disposed along the path of the robot, said robot including:

a first gripper for gripping and carrying the cone-like articles aligned on the aligning and supplying device, and

a second gripper for gripping and carrying the cone-like articles inverted on said inverting device,

said first gripper having a pitch changing device for chang-

ing the pitch of the plurality of cone-like articles as the cone-like articles are gripped and carried from the aligning and supplying device to the inverting device, and

said inverting device having a plurality of sets of article holders for holding the plurality of cone-like articles, each set of article holders being relatively spaced by a different pitch, one set of article holders having a pitch corresponding to the pitch of the cone-like articles carried by the first gripper.

4,686,814

BAG FOR CONTAINING FLOWABLE FOODSTUFF

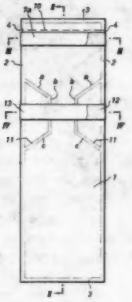
Shozaburo Yanase, Osaka, Japan, assignor to Yanase Waitch K.K., Osaka, Japan

Filed Sep. 9, 1985, Ser. No. 773,545

Claims priority, application Japan, Jun. 3, 1985, 60-83482[U]; Jun. 3, 1985, 60-83483[U]

Int. Cl.[4] B65B *43/32, 7/10;* **B65D** *33/20*

U.S. Cl. 53—459 **25 Claims**



1. A bag made of a film sealed by welding for containing flowable foodstuffs, said bag comprising:

(a) a notch provided on at least one longitudinal welded edge of the body at a position adjacent to one of the transverse edges of the bag for tearing open the bag from said notch;

(b) reinforcing band attached to at least one surface of the bag in parallel with said one of the transverse edges over an entire width in a transverse direction of the bag for guiding the tearing of the bag along an edge of said reinforcing band through said notch, said reinforcing band being positioned adjacent to the position at which said notch is provided as well as positioned such that said notch situates between said reinforcing band and said one of transverse edges; and

(c) an adhesive band attached to at least one surface of the bag for reclosing an opening formed by tearing the bag along the edge of said reinforcing band through said notch in cooperation with said reinforcing band after the bag has been opened and flowable foodstuffs have been placed in the bag, said adhesive band being positioned between said reinforcing band and the other one of said transverse edges of the bag.

4,686,815

METHOD AND APPARATUS FOR LOADING ARTICLES

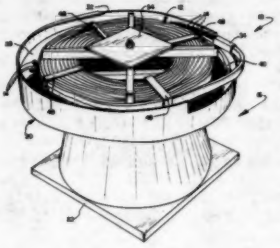
James A. Zils, Parma, and Radoslav Markovic, Maple Heights, both of Ohio, assignors to RB & W Corporation, Mentor, Ohio

Filed Jun. 3, 1986, Ser. No. 870,082

Int. Cl.[4] B65B *9/10, 5/10, 1/22*

U.S. Cl. 53—469 **19 Claims**

1. An apparatus comprising feed bowl means for holding a plurality of articles, said feed bowl means having a bottom, a generally circular rim portion, and track means for conducting articles upwardly from the bottom of said feed bowl means to the rim portion of said feed bowl means, flexible tube means for holding articles supplied from said feed bowl means, said flexible tube means having an open end portion through which articles from said feed bowl means can enter said flexible tube means and a second end portion which is at least partially closed to block movement of articles out of said tube means, said flexible tube means being disposed in a coil having a plurality of turns which are smaller than said rim portion of said



feed bowl means, connector means for connecting the open end portion of said coiled flexible tube means to said rim portion of said feed bowl means for movement therewith, and motor means for vibrating said feed bowl means, coiled flexible tube means and articles in said coiled flexible tube means to move articles from said feed bowl means into said coiled flexible tube means and to move articles along the turns of said coiled flexible tube means while maintaining the total number of articles being vibrated constant.

4,686,816

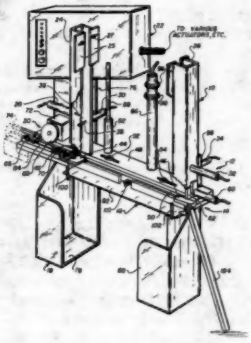
DIP TUBE LOADER AND HANDLER APPARATUS

Ernst Keller, 259 Leota Ave., Sunnyvale, Calif. 94086

Filed Apr. 30, 1986, Ser. No. 857,851

Int. Cl.[4] B65B *5/10*

U.S. Cl. 53—536 **16 Claims**



1. An improved DIP handler and loading apparatus, comprising:

magazine means adapted to contain a plurality of DIP tubes oriented in a predetermined manner, said magazine means including a pair of spaced apart channel shaped members forming an upwardly directed passageway into which a plurality of DIP tubes may be positioned and through which said tubes may pass under the influence of gravity;

means forming a tube loading station having an input track

means and singulating means for admitting a predetermined number of DIPs to said loading station;

tube singulation means associated with said magazine means and operative to present one tube at a time to said loading station;

tube positioning means associated with said loading station and operative to position a tube into DIP receiving engagement with said input track means;

output bin means for receiving tubes loaded with DIPs; and

elevator means adapted to receive tubes loaded with DIPs at said loading station and to transport said loaded tubes to said output bin means.

4,686,817

BALE BAGGING APPARATUS

Gerald L. C. Brodrecht, R.R. #1, Thorsby, Alberta T0C 2P0, Canada, and Rueben Halwa, Box 68, Thorsby, Alberta, Canada

Filed Apr. 1, 1986, Ser. No. 846,678
Int. Cl.[4] B65B *9/00*
U.S. Cl. 53—567 **5 Claims**

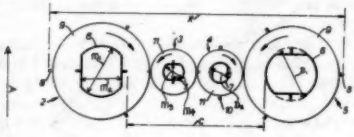
1. An apparatus for loading a bale into an elongated plastic bag comprising front frame means abutting one end of a row of aligned bales, rear frame means for supporting a plastic bag in a forwardly opening position for receiving a bale, cable and pulley means connecting said front and rear frame means for drawing said front and rear frame means toward each other and thereby drawing a bale around one of said bales, said front frame means including pin means for penetrating a bale and tooth means for penetrating the ground and thereby retarding movement of said front frame means toward said rear frame means.

4,686,818

MOWING MACHINE

Petrus W. Zweegers, Nuenenseweg 165, P.O. Box 9, 5660 AA Geldrop, Netherlands

Continuation-in-part of Ser. No. 632,384, Jul. 19, 1984, abandoned. This application Oct. 23, 1985, Ser. No. 790,623
Claims priority, application Netherlands, Jul. 16, 1983, 8302556
Int. Cl.[4] A01D *55/18*
U.S. Cl. 56—192 **3 Claims**



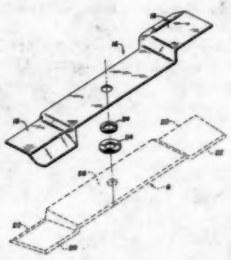
1. A mowing machine comprising a rigid frame beam, at least four cutting members carried by said frame beam and rotatable about upwardly extending rotary axes and being each provided with cutters and drums located above said cutters, said drums each having the same height, the cutting members being driven so that during operation neighboring drums rotate in opposite senses characterized in that the diameters of the circles described by the ends of the cutters of the outermost cutting members during operation are larger than those of the intermediate cutting members and the sectional areas of the drums of the outermost cutting members are larger than those of the intermediate cutting members whereby the swath of the cut crop is reduced with respect to the mowing width of the cutting members.

4,686,819

MULCHER ATTACHMENT

Peter B. Bryant, 6785 Napier Street, Burnaby, British Columbia, Canada V5B 2C5

Filed Sep. 30, 1985, Ser. No. 781,582
Int. Cl.[4] A01D *55/18*
U.S. Cl. 56—295 **7 Claims**



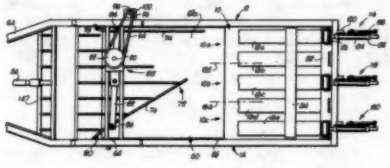
1. In a rotary lawnmower comprising a motor, drive shaft extending from the motor, a cutting blade with cutting edges and trailing edges, attached to the drive shaft to rotate with the shaft to cut grass, a housing surrounding the blade, the improvement comprising a mulcher attachment free of a cutting edge and fastened generally parallel to the blade, above the blade, and shaped to provide deflectors to be spaced from the cutting portion of the blade, the deflectors comprising downwardly directed portions formed on the mulcher attachment adjacent and above the blade trailing edges, whereby cut grass from the blade is directed against the deflector portion and downwardly back in the grass as a mulch.

4,686,820

CYLINDRICAL BALER HAVING BALE-SHAPE-RESPONSIVE LOADING CONTROL SYSTEM

Bryan K. Andra, Hays; Kent D. Funk, Manhattan; Clyde J. Lang, Ellis, and Philip Todd, Maple Hill, all of Kans., assignors to Kansas State University Research Foundation, Manhattan, Kans.

Filed Feb. 22, 1985, Ser. No. 704,429
Int. Cl.[4] A01D *39/00*
U.S. Cl. 56—341 **36 Claims**



1. In a mobile baler for making cylindrical bales from crop material lifted from a windrow on the ground and fed into a baling chamber of the baler as the latter advances, the improvement comprising:

structure selectively shiftable laterally relative to the chamber for directing incoming crop material into a selected one of plurality of transverse sections of the chamber;

means for sensing the relative sizes of bale portions forming in the respective chamber sections; and

control mechanism operably coupled with said sensing means for intermittently shifting said structure between the plurality of chamber sections in response to a determination that the size of the bale portion in the chamber section receiving materials from said structure exceeds the size of the bale portion in a next adjacent chamber section by a certain, predetermined amount.

4,686,821

YARN SPLICING APPARATUS WITH A YARN END UNTWISTING DEVICE

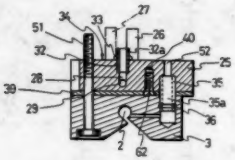
Hirosige Maruki, Kusatsu, Japan, assignor to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Apr. 9, 1986, Ser. No. 850,540

Claims priority, application Japan, Apr. 11, 1985, 60-53908[U]

Int. Cl.⁴ D01H *15/00*

U.S. Cl. 57—22 **9 Claims**



1. A yarn splicing apparatus comprising:

a yarn splicing member provided with a yarn splicing hole having a first compressed fluid jetting hole,

yarn clamping devices disposed on opposing sides of the yarn splicing member,

a yarn cutting device provided between the yarn splicing member and each of the yarn clamping devices, respectively,

untwisting nozzle pipes for untwisting the cut yarn ends provided in an untwisting nozzle block to which the yarn splicing member is removably mounted, and

a yarn splicing apparatus body block on which said untwisting nozzle block and said splicing nozzle member are mounted

whereby said untwisting nozzle pipes may be removed from said yarn splicing apparatus independent of said yarn splicing member.

4,686,822

GAS TURBINE POWER STATION WITH AIR STORAGE AND METHOD FOR OPERATING THE SAME

Hansulrich Frutschi, Riniken, Switzerland, assignor to BBC Brown, Boveri & Company Limited, Baden, Switzerland

Division of Ser. No. 673,942, Nov. 21, 1984, abandoned. This application Oct. 22, 1986, Ser. No. 921,884

Claims priority, application Switzerland, Jan. 31, 1984, 446/84

Int. Cl.⁴ F02C *7/00*

U.S. Cl. 60—39.02 **5 Claims**

1. Method for driving a gas turbine power station with air storage having a gas turbine, a multi-stage compressor group which can be driven by the turbine, having intermediate coolers and an aftercooler, having a generator which is selectively operable as an electric motor, having compressed air pipes which connect the turbine to the compressor group and to an underground air storage cavern, having valve devices in the compressed air pipes by means of which the turbine can be brought into fluid connection with the compressor group, with the air storage cavern alone, or simultaneously with both, or the compressor group can be brought into fluid connection with the air storage cavern alone, in addition having a recooperator for preheating of the compressed air by the turbine exhaust gas before the entry of the compressed air into a combustion chamber, wherein:

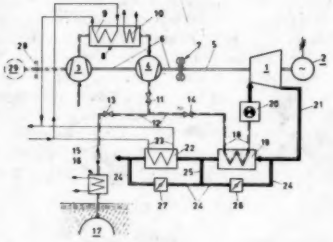
(a) the compressor group is designed for a pressure ratio at which the compressor final pressure is at least equal to the maximum storage air pressure;

(b) a rotational speed synchronizing connecting device is provided in the line of driving shafts between the turbine and the compressor group, with which speed synchronizing connecting device the speed of the shaft of the compressor group can be brought to the speed of the turbine shaft and the shaft of the compressor group can be mechanically rigidly coupled to the line of driving shafts of the turbine; and

(c) the throughput of the compressor group can be adjusted during operation,

said method comprising the steps of:

(d) operating the power station at nominal power without storage air, the turbine being rigidly coupled to the compressor group and the generator, by supplying the turbine with compressed air exclusively from the compressor group with the compressor guide vanes fully open and therefore at maximum output flow;



(e) operating the power station at part load, the turbine being rigidly coupled to the compressor group and the generator and the compressor blading being fully open, with throttle supplied to the turbine and storage of the remainder of the air supplied by the compressor group in the storage cavern;

(f) operating the power station at idle with air storage, the turbine being rigidly coupled to the compressor group and the generator and a part of the air supplied by the compressor group being supplied to the storage cavern, with a reduced supply to the turbine of air from the compressor group such that the turbine power just suffices to drive the compressor group and the generator output is zero;

(g) operating the power station at overload, the turbine being rigidly coupled to the compressor group and the generator and the blading of the compressor group being closed to the smallest permissible flow quantity and the air necessary in addition to the air supplied by the compressor group being drawn from the storage cavern; and

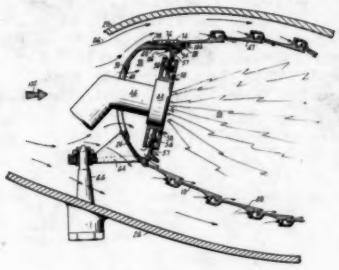
(h) operating the power station at maximum power, the compressor group being uncoupled from the turbine and the generator and the turbine being exclusively supplied with air from the storage cavern.

4,686,823

SLIDING JOINT FOR AN ANNULAR COMBUSTOR

Robert E. Coburn, Mansfield Center, and John A. Matthews, Melrose, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Apr. 28, 1986, Ser. No. 856,729
Int. Cl.[4] F02C 7/20, 1/00
U.S. Cl. 60—39.32 5 Claims



1. A sliding joint arrangement for annular combustion chamber, comprising:

an annular combustor head disposed in an annular stream of flowing air, the combustor having a convex upstream surface for diverting at least a portion of the flowing airstream radially inward, the head further defining a radially inward-facing cylindrical surface, located immediately downstream from the convex surface;

an inner chamber liner, annularly downstream of the combustor head for separating the radially inward diverted portion of the flowing air stream from a high temperature combustion reaction occurring downstream of the combustor head, the inner liner further including

an annular resilient sealing ring disposed about the upstream end of the inner liner, the sealing ring defining a radially outward facing sealing surface abutting the radially inward facing cylindrical surface for defining a sliding leak resistant sealing engagement therebetween; and

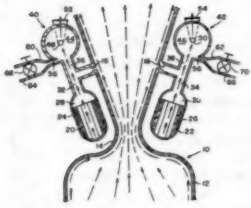
an annular, radially extending bulkhead integral with the combustor head for forming a thermal shield between the engaged surface and ring and the downstream high temperature combustion reaction.

4,686,824

GASEOUS SECONDARY INJECTION THRUST VECTOR CONTROL DEVICE

J. C. Dunaway, Falkville, and Paul L. Jacobs, Huntsville, both of Ala., assignors to United States of America as Represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 25, 1982, Ser. No. 362,017
Int. Cl.[4] F02K 1/00, 1/28
U.S. Cl. 60—231 3 Claims



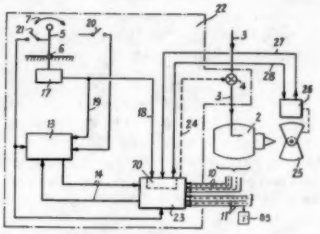
1. In combination with a reaction motor having a combustion chamber and an exhaust nozzle, a thrust vector control system comprising a plurality of gas generators with each gas generator having a passage with a nozzle therein that communicates with a diverging portion of said exhaust nozzle for discharging gases from said gas generators into said diverging portion of said exhaust nozzle angularly with respect to normal flow of exhaust gases through said exhaust nozzle, each of said gas generators also having a fluid valve means connected thereto with an inlet opening to said fluid valve means in communication with gases from its respective gas generator and a control port with valving means therein and opening into a chamber of said fluid valve means adjacent said inlet opeing to said fluid valve means for controlling flow through said control port by opening and closing said valving means, said fluid valve means having an outlet therefrom for exhausting therethrough, and each of said gas generators having such a solid propellant therein whereby when said valving means in opened for controlling flow through its respective fluid valve means, the pressure in said gas generator is caused to increase and the burning rate of said solid propellant in said gas generator is also caused to increase.

4,686,825

SYSTEM FOR SUPPLYING FUEL TO AN AIRCRAFT ENGINE

Victor Cavasa, Pibrac, and Jean-Marc Fontaine, Ramonville, both of France, assignors to Aerospatiale Societe Nationale Industrielle, Paris, France

Filed Mar. 14, 1986, Ser. No. 839,545
Claims priority, application France, Apr. 3, 1985, 85 05077
Int. Cl.[4] F02C 9/28
U.S. Cl. 60—243 16 Claims



1. In a system for supplying fuel to an aircraft engine, of the type comprising:

a controlled valve, controlling the flowrate of fuel admitted into said engine;

a throttle lever, mobile in two opposite directions in a stroke defined by two end positions, said lever being associated with a resolver capable of delivering a continuous signal indicative of the position of said lever;

a transmission arranged between said throttle lever and said controlled valve, to cause one position of said valve to correspond to one position of said lever, said transmission comprising a correction device which, on the one hand, receives a plurality of parameters concerning both the operation of the engine and the environment of said aircraft, as well as the signal from the resolver, and, on the other hand, is capable of correcting the control of said valve by said lever to take into account said parameters;

an electronic thrust-adjusting device receiving at least certain of said parameters and the signal from the resolver, and delivering a signal indicative of a reference thrust; and

switching means enabling said controlled valve to be controlled:

either by voluntary manual actuation of said throttle lever,

or, at least at cruising speed of the aircraft, automatically via said electronic thrust-adjusting device,

said correction device is entirely electrical and controls said valve via its output signal;

the electrical connection between said resolver and said correction device is the sole link between said throttle lever and said correction device;

said correction device comprises:

first means for subdividing the signal from said resolver into a plurality of consecutive portions;

second means for converting each of said portions of signal from the resolver into an elementary valve-control signal, which is characteristic of a control phase of said aircraft and whose ends, except possibly for that elementary valve-control signal which corresponds to idling of the engine, constitute, one, the maximum value and the other, the minimum value of said corresponding elementary signal, the output signal of said correction device being constituted by the juxtaposition of said elementary valve-control signals, with the result that,

on the one hand, there is established a mathematical function which ensures that a thrust for the motor corresponds to each position of the throttle lever, and

on the other hand, the stroke of said throttle lever is subdivided into a plurality of consecutive zones of which each is associated with a control phase, and corresponds to a thrust range for said engine, the ends of each zone corresponding, one, to the maximum value and the other, to the minimum value of the thrust in the corresponding range; and

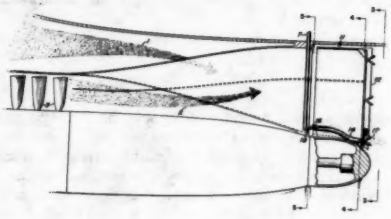
third means which, when the electronic thrustadjusting device is switched off by action of said switching means, and when said throttle lever lies within such a zone and as a function of said parameters, automatically cause the thrust to vary within the corresponding range, the variation in thrust being effected, from the value corresponding to the position of the throttle lever, both towards said maximum value and towards the minimum value of said range, said maximum and minimum values constituting limits not to be overstepped.

4,686,826

MIXED FLOW AUGMENTOR INCORPORATING A FUEL/AIR TUBE

John M. Koshoffer; Richard A. Pfefferle, and Harold A. Larson, all of Cincinnati, Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 14, 1980, Ser. No. 149,792
Int. Cl.[4] F02K *3/10, 3/04*
U.S. Cl. 60—261 **2 Claims**



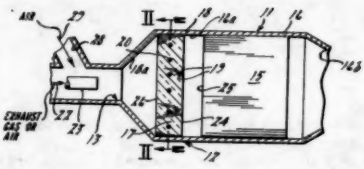
1. In a turbofan jet engine having a rotatable mixer in the gas stream of said engine for mixing fuel and air, said mixer comprising a radially sectored structure defining a plurality of axially extending troughs, a fuel source attached to the stationary structure of said engine upstream of said mixer, and an ignitor and flameholder downstream of said mixer, an improvement comprising: a transfer tube disposed in each alternate trough and rigidly attached to said mixer, each tube having an inlet near an upstream end of said mixer and an outlet near a downstream end of said mixer for capturing a fuel-rich fuel-air mixture from said source, transporting said mixture through said mixer and releasing said mixture at the downstream end of said mixer in the immediate vicinity of said ignitor and flameholder, the respective inlet of each said tube being aligned to capture substantially all the fuel released from said source at said respective inlet.

4,686,827

FILTRATION SYSTEM FOR DIESEL ENGINE EXHAUST-II

Wallace R. Wade, Farmington Hills, and Vemulapalli D. N. Rao, Bloomfield Township, Oakland County both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 463,686, Feb. 3, 1983. This application Apr. 9, 1986, Ser. No. 849,927
Int. Cl.[4] F01N *3/02*
U.S. Cl. 60—286 **2 Claims**



1. A filtration system operative to remove oxidizable particulates from the exhaust gas of a diesel engine, comprising:

(a) filtration means having a filter element operative to filter out and collect a substantial portion of the entrained particulates in the exhaust gas;

(b) ignition means having a source of energy selectively supplied for a limited period to effect ignition of the leading portion of said particulate collection, said ignition means being comprised of (i) a flow of hydrocarbon enriched exhaust gas, (ii) a tubular foraminous member carrying a catalyst material effective to lower the ignition temperature of said hydrocarbon enriched gas, (iii) a supplementary heating element effective to raise the temperature of the foraminous member and catalyst material to a catalyzed oxidation temperature of the hydrocarbon enriched gas, and (iv) a flow control means effective to normally permit the nonenriched exhaust gas to flow through the interior of the tubular member without transgressing the radial thickness of the tubular member; and, during regeneration, the hydrocarbon enriched exhaust gas is forced to pass in a radial direction of the foraminous member before exiting therefrom; and

(c) means for conducting a flow a exhaust gas of said engine through said filtration means immediately following the ignition, without addition of other energy or hydrocarbon fuel, said flow of exhaust gas being utilized to support the continued oxidation of the ignited particulate collection.

4,686,828

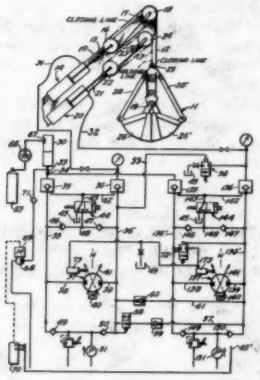
HYDRAULICALLY OPERATED CLAMSHELL DEVICE

Allan H. Rosman, Woodland Hills, Calif., assignor to Dynamic Hydraulic Systems, Inc., Canoga Park, Calif.

Continuation-in-part of Ser. No. 633,397, Jul. 23, 1984, which is a continuation-in-part of Ser. No. 601.481, Apr. 18, 1984, which is a continuation-in-part of Ser. No. 570,590, Jan. 13, 1984. This application Oct. 11, 1985, Ser. No. 786,862
Int. Cl.[4] F16D *31/02*
U.S. Cl. 60—415 **7 Claims**

1. In a cable-suspended hydraulically actuated lift system wherein a clamshell or the like device having separate holding-line and closing-line connections is to be lifted and/or actuated

by separate cables respectively coupled to said holding-line and to said closing-line connections, the improvement wherein first and second hydraulic-lift actuators are mounted in tandem for independent actuation of the respective cables, pressurized hydraulic-accumulator means independently connected to said hydraulic-lift actuators in the direction to provide lifting force via each of said actuators, a separate reversibly controllable rotary hydraulic power integrator in each of said accumulator connections to said hydraulic-lift actuators, whereby a closing-line actuator connection connects a closing-line integrator to the closing-line actuator and a holding-line actuator connection connects a holding-line integrator to the holding-line actuator; a first load-sharing hydraulic connection including first threshold-operated check-valve means connecting and providing flow from said closing-line actuator connection to said holding-line actuator connection only for closing-line



actuator pressure of at least a predetermined threshold level, pressure-operated valve means responding to instantaneous closing-line actuator pressure and relieving hydraulic fluid to sump from said holding-line actuator only for closing-line actuator pressures below said predetermined threshold level, whereby at commencement of a lifting operation said closing-line actuator alone will be operative until the clamshell is closed and further whereby both actuators can share a lifting load upon achievement of said predetermined threshold level in a lifting-control operation of said closing-line integrator; further whereby, once both actuators have commenced sharing the lifting load, the holding-line integrator may be shifted to its lifting-control condition, in aid of the lifting-control condition of the closing-line integrator; and still further whereby, at a desired lifted elevation of the load, the load may be dumped by clamshell opening, upon shifting the closing-line integrator to its descent-control condition.

4,686,829

ROTARY HYDROSTATIC RADIAL PISTON MACHINES

Christian H. Thoma, St. Clement, and George D. M. Arnold, St. Helier, both of Channel Islands, assignors to Unipat AG, Glarus, Switzerland

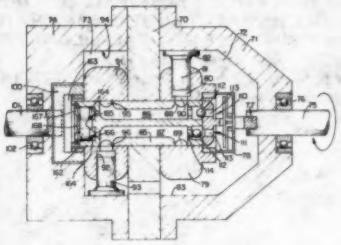
Continuation of Ser. No. 590,590, Jan. 26, 1984, abandoned. This application May 21, 1986, Ser. No. 865,585

Claims priority, application United Kingdom, Jun. 3, 1982, 8216154; PCT Int'l Appl., May 27, 1983, PCT/EP83/00135

Int. Cl.[4] F16D *31/02*

U.S. Cl. 60—464 **4 Claims**

1. In a hydrostatic transmission comprising a casing; an internal transverse partitioning wall dividing said casing into first and second chambers; a pintle fixedly and non-rotatably mounted in said partitioning wall, said pintle having first and second ends extending into said first and second chambers, respectively, and internal parallel first and second hydraulic fluid passages terminating in ports; a rotary cylinder barrel rotatably mounted on each of said first and second extending pintle ends, each said barrel comprising a plurality of radially arranged cylinders and a plurality of pistons disposed in said cylinders, said cylinders successively communicating with said ports during rotation of said barrels; an annular cam track surrounding each said barrel, said pistons engaging said cam track; first and second rotary shafts rotatably mounted in said casing and extending into said first and second chambers,



respectively; and means coupling said shafts to said barrels; the improvement in which: a non-return valve is mounted in at least one of said first and second pintle ends, said valve admitting make-up fluid to a said fluid passage when pressure in said chamber corresponding to said at least one end exceeds that in said passage; and said coupling means exposes said at least one pintle end, and hence said valve, to said corresponding chamber.

4,686,830

SYSTEM FOR CONTROL OF THE SUPERCHARGING OF AN INTERNAL COMBUSTION ENGINE

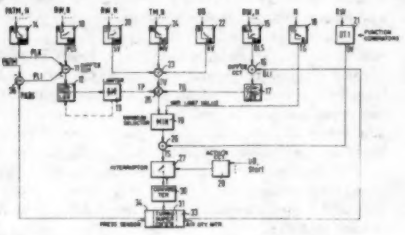
Rainer Buck, Tamm; Wolf Wessel, Oberriexingen, and Gerhard Stumpp, Stuttgart, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Sep. 30, 1985, Ser. No. 781,758

Claims priority, application Fed. Rep. of Germany, Oct. 18, 1984, 3438175

Int. Cl.[4] F02D *23/00*

U.S. Cl. 60—603 **15 Claims**



1. Apparatus for control of the charge pressure provided to an internal combustion engine by an adjustable turbosupercharger having a displaceable output-affecting control member for its mechanism, whereby the air supply to said engine through said turbosupercharger is controlled by a regulation loop in which a desired air supply for the particular engine operating conditions is compared with actual air supply to produce an error signal for control of the air output of said adjustable supercharger by said displaceable control member, and wherein according to the invention there are superimposed upon said error signal both a static anticipatory control signal dependent upon engine speed and engine load and also a dynamic anticipatory control signal dependent upon rate of change of engine load, the negine load being measured by the

displacement of a mechanical member in response to engine load value, the rate of change of engine load by the rate of said displacement and said static anticipatory control signal including additive contributions of correction signals responsive respectively to battery voltage and engine temperature.

4,686,831

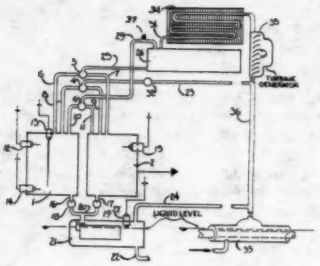
SYSTEM AND METHOD OF DELIVERING LOW/PRESSURE/LOW TEMPERATURE FLUIDS INTO HIGH PRESSURE/HIGH TEMPERATURE HEAT EXCHANGERS BY MEANS OF ALTERNATE PRESSURE EQUALIZATION

Robert E. Silva, 6452 N. 8th, Fresno, Calif. 93710-4302

Continuation-in-part of Ser. No. 648,980, Dec. 18, 1984, abandoned. This application May 23, 1986, Ser. No. 866,268

Int. Cl.[4] F01K *13/00*

U.S. Cl. 60—645 **3 Claims**



3. An improved system and method of introducing low pressure fluids into a high pressure heat exchanger wherein the method includes the following steps:

delivering a fluid in the liquid state into a storage tank wherein atmospheric pressure equilibrium exists;

delivering the liquid from the storage tank into alternating tanks, under alternating conditions;

delivering atmospheric pressure equilibrium between the storage tank and the alternating tank being filled;

providing elevation differential between the storage tank and the alternating tanks such that the liquid in the storage tank can flow into the alternating tanks, under alternating conditions, when the alternating tank being filled is in opened conduit communication with the storage tank wherein one opened conduit provides atmospheric pressure equilibrium between the storage tank and the said tank being filled and a second opened conduit provides liquid access to the lower said tank from the storage tank;

delivering high pressure vapor equilibrium to the alternating tank being emptied while, at the same time, isolating the said tank from atmospheric pressure equilibrium with the storage tank;

isolating the emptying alternating tank from liquid communication with the storage tank;

automatically switching the alternating tanks from a filling mode to an emptying mode such that while one said tank is filling the other said tank is emptying;

providing elevation differential between the alternating tanks and a lower disposed liquid flow control tank;

delivering liquid from the filled alternating tank into the lower disposed liquid flow control tank while, at the same time, delivering liquid from the storage tank into the lower disposed emptied alternating tank;

providing high pressure vapor equilibrium between the liquid flow control tank and the alternating tank that is delivering liquid into the said liquid flow control tank;

regulating the liquid input from the emptying alternating tank into the liquid flow control tank by means of an articulated float valve disposed in the top part of the said control tank;

disposing check valves in the delivering conduits between the alternating tanks and the liquid flow control tank such that, when the emptying alternating tank is closed to liquid input into the liquid flow control tank by the float valve disposed therein, the liquid is prevented from entering the other alternating tank by means of the said check valves;

disposing the liquid flow control tank at such an elevation that the average maintained liquid level therein is equal to the average liquid level desired in the heat exchanger;

delivering liquid from the liquid flow control tank into the heat exchanger through permanently opened interconnecting conduit at a rate equal to the rate of liquid conversion into vapor within the heat exchanger;

providing high pressure vapor equilibrium communication between the liquid flow control tank and the heat exchanger through permanently opened interconnecting conduit being attached to the top part of each said tank and exchanger;

delivering the high pressure vapor produced by the heat exchanger into dispensing conduit for use by the alternating tanks and a pressure driven turbine generator and a vapor condensing means.

4,686,832

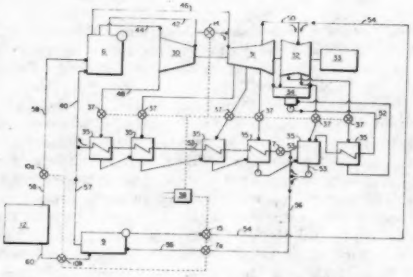
INTEGRATED FUEL CLEANING AND POWER GENERATION

Emmanuel S. Miliaras, 12 Mount Pleasant St., Winchester, Mass. 02142

Filed Apr. 28, 1986, Ser. No. 859,056

Int. Cl.[4] F01K *21/00*

U.S. Cl. 60—676 **15 Claims**



1. A power generation system comprising:

a primary combustor utilizing a relatively clean, high heat valve fuel to provide a relatively high source of heat;

a fluid in heat exchange with said primary combustor whereby said fluid is thermally energized;

means for expanding said energized fluid to obtain a work output;

means for recirculating said fluid back to said primary combustor to produce a closed system and establish a power generation cycle;

at least one further combustor which utilizes a lesser quality of fuel than said first combustor for producing a lower grade source of heat;

means for furnishing heat from said second combustor to a part of said power generation cycle other than that of said primary combustor;

means for processing a source of fuel whereby a supply of high and low grade fuel is produced;

means for selectively furnishing both said primary and secondary combustors with appropriate fuel from said fuel processing means; and

means for selectively operating said primary and secondary combustors in accordance with an operating parameter of said power generation cycle.

4,686,833

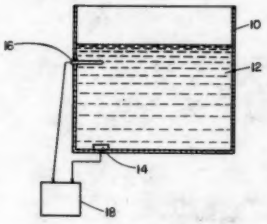
METHOD OF FORMING CLATHRATE ICE

Toshiyuki Hino, Tokyo, Japan, and Anthony J. Gorski, Lemont, Ill., assignors to The United States of America as represented by the United State Department of Energy, Washington, D.C.

Continuation of Ser. No. 781,541, Sep. 30, 1985, abandoned. This application Jul. 28, 1986, Ser. No. 889,308

Int. Cl.[4] F25C *1/00*

U.S. Cl. 62—68 **6 Claims**



1. A method of forming ice in a supercooled water-based clathrate liquid contained in a vessel comprising the steps of:

locating an oscillator device having an oscillator plate in the liquid in the vessel; and

oscillating the oscillator plate, ultrasonically to produce cavities in the liquid behind the plate thereby forming small crystals of clathrate in the liquid surrounding the cavities, which crystals serve as seed crystals for ice formation in the liquid.

4,686,834

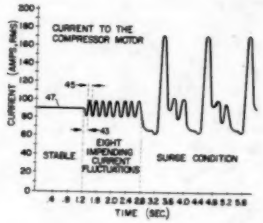
CENTRIFUGAL COMPRESSOR CONTROLLER FOR MINIMIZING POWER CONSUMPTION WHILE AVOIDING SURGE

Paul F. Haley; Brian S. Junk, both of La Crosse; Merle A. Renaud, Onalaska, and Paul C. Rentmeester, La Crosse, all of Wis., assignors to American Standard Inc., New York, N.Y.

Filed Jun. 9, 1986, Ser. No. 872,314

Int. Cl.[4] F25B *41/00*

U.S. Cl. 62—209 **19 Claims**



1. For use with a variable capacity centrifugal compressor driven by an electric motor, a controller for adjusting the capacity of the compressor to satisfy a demand, minimize electric power consumption and avoid a surge condition, comprising:

a. means for sensing an operating parameter that is indicative of the capacity of the compressor;

b. means for setting a selected setpoint that represents a desired value of the operating parameter;

c. surge sensing means for detecting an impending surge by sensing fluctuation in the electric current supplied to the compressor motor, wherein an impending surge is detected whenever fluctuations in excess of a predetermined amplitude occur in excess of a predetermined frequency; and

d. control means, responsive to the operating parameter sensing means, the setpoint setting means, and the surge sensing means, for controlling the compressor, such that its capacity is minimally above a level that would cause a surge condition yet is sufficient to maintain the operating parameter at the setpoint.

4,686,835

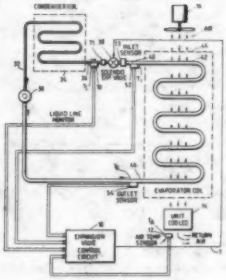
PULSE CONTROLLED SOLENOID VALVE WITH LOW AMBIENT START-UP MEANS

Richard H. Alsenz, 2402 Creekmeadows Dr., Missouri City, Tex. 77459

Division of Ser. No. 639,271, Aug. 8, 1984, Pat. No. 4,651,535. This application Nov. 28, 1986, Ser. No. 936,102

Int. Cl.[4] F25B *41/04*

U.S. Cl. 62—223 **4 Claims**



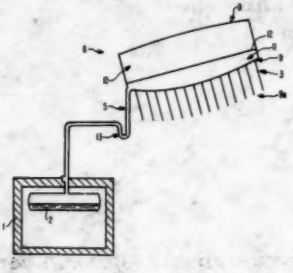
1. A refrigeration system having in a closed loop connection a compressor having an inlet and an outlet end, a condenser connected to the outlet end of said compressor and responsive to a high pressure gaseous phase recirculating refrigerant for condensing the refrigerant from its gaseous to its liquid phase, an evaporator having an inlet and an outlet end and connected to said condenser and to the inlet end of said compressor, an expansion valve having an inlet and an outlet end and connected between the outlet end of said condenser and the inlet end of said evaporator, said condenser delivering high pressure liquid refrigerant to the inlet end of said expansion valve, said refrigerant expanding as it flows through said expansion valve, a controller circuit responsive to the superheat of the refrigerant in said evaporator for controlling the flow of refrigerant through said expansion valve, and a low ambient start-up means responsive to the presence of liquid refrigerant at the inlet end of said expansion valve for overriding normal operations of said valve and maintaining said expansion valve open for refrigerant flow therethrough when liquid refrigerant is not present, said low ambient start-up means returning control for normal operations of said valve when liquid refrigerant is present.

4,686,836

THERMAL ENERGY COLLECTOR AND SYSTEM INCLUDING A COLLECTOR OF THIS KIND

Gerard Paeye, Carquefou, and Alain Guiader, Nantes, both of France, assignors to Jeumont-Schneider Corporation, Puteaux cedex, France

Filed Dec. 4, 1985, Ser. No. 805,091
Claims priority, application France, Dec. 6, 1984, 84 18635
Int. Cl.[4] F25B *27/00*
U.S. Cl. 62—235.1 **9 Claims**



1. In an adsorption-desorption solar energy collector having a compartment defined by an upper surface to be faced toward the sun, and a bottom surface spaced from the upper surface and joined thereto by sidewalls of the compartment, there being contained within the compartment an adsorbent-desorbent material, the improvement wherein:

said material is supported against said upper surface and spaced from said bottom surface by a layer having opening means for permitting vaporized working fluid to flow to and from said material,

said bottom surface constitutes a condenser surface for condensing desorbed vapors from said material, and

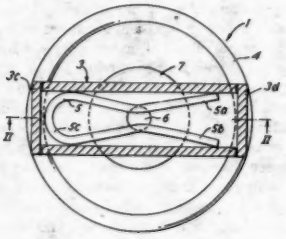
said bottom surface further has an opening disposed for permitting condensed liquid to flow out of said collector.

4,686,837

PERSONAL DECORATION RETAINER

Graham J. Carre, Sunset Cottage, Franc Fief Lane, St. Sampsons, Guernsey, Channel Islands

Filed Dec. 19, 1985, Ser. No. 810,986
Claims priority, application United Kingdom,
Int. Cl.[4] A44C *7/00*; A44B *9/00*
U.S. Cl. 63—12 **20 Claims**



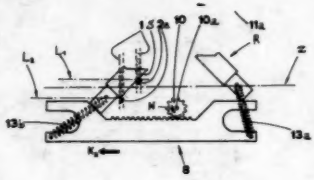
1. A retainer, for supporting a decorative article on the person, comprising a pin member and a fastening device separably connectable thereto, the fastening device including an elongate tubular housing having opposed side walls and having intermediate said side walls aperture means through which said pin member can pass with clearance, and an elongate generally U-shaped spring clip located in said housing and having legs abutting said opposed side walls and bowed towards each other to provide a gripping portion to grip the pin member passing through said aperture means thereby frictionally holding the pin member releasably in said housing.

4,686,838

DEVICE FOR REGULATING THE STITCH DENSITY OR AUTOMATIC FLAT KNITTING MACHINES

Benito Stoppazzini, Sala Bolognese, Italy, assignor to E.M.M. Emiliana Macchine Maglieria S.R.L., Bologna, Italy

Filed Aug. 12, 1986, Ser. No. 895,683
Claims priority, application Italy, Sep. 18, 1985, 3552 A/85
Int. Cl.[4] D04B *7/00*
U.S. Cl. 66—71 **4 Claims**



1. A device for regulating the stitch density of automatic flat knitting machines, that is situated in a carriage of such a machine and includes two stitch density adjustment cams, integral with a same number of slides, wherein two slide and cam pairs are located symmetrically with respect to a plane perpendicular to that of movement of said carriage, and wherein the cam that is located downstream in respect of a given direction of movement of the carriage is destined to strike corresponding heels made on needles sent into operation, consequently determining the length of the return stroke of said needles themselves; and device including: a plate situated below lower extremities of said two slides, sliding in the direction of movement of said carriage, and enabled to move in both directions, with respect to this latter, by moving means; two tracks symmetrical to said plane perpendicular to the direction of movement being formed in said plate, serving for the sliding of and as stop for said corresponding lower extremities of said slides, these latter maintaining contact with said relevant tracks through the action of elastic means acting on the said slides; with each track being composed of a flat surface, parallel to said direction of movement of said carriage, and an inclined surface following on from the former towards the inside of said plate, said flat and inclined surfaces respectively determining said relevant slide's at rest position, and a lowered position that is adjustable with respect to the at rest position according to the movement of said plate in a corresponding direction.

4,686,839

FLAT KNITTING MACHINE WITH NEEDLE SELECTION DEVICE

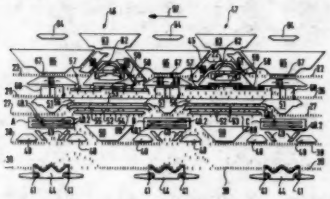
Franz Schmid, Bodelshausen, Fed. Rep. of Germany, assignor to H. Stoll GmbH & Co., Fed. Rep. of Germany

Filed Nov. 18, 1986, Ser. No. 931,790
Claims priority, application Fed. Rep. of Germany, Nov. 21, 1985, 3541171
Int. Cl.[4] D04B *7/00, 15/66*
U.S. Cl. 66—75.2 **14 Claims**

1. A flat knitting machine with a needle selection device, having two needle beds provided with tricks for guiding needles, needle jacks and selection jacks and a cam carriage with combined knitting and loop transfer systems, which have adjustable presser cam elements for a depressor jack associated with each needle, adjustable lowering cam elements, and needle jacks which are articulated with the longitudinally moveable needles and have a control butt, which can be sunk into the needle bed and thus removed from the cam tracks of the cam carriage, characterised in that the selection points (A, B, C) associated with the combined systems (46, 47) are con-

structed in each case as double selection points with two selection magnets (40.1, 40.2) following directly upon one another, with each of which is associated a selection jack-raising cam element (48, 49) with different raising heights,

further characterised in that the depressor jack is formed as a locking jack (25), which can be engaged by the associated selection jack (33) and has a depressor butt (26), a



longitudinal adjustment butt (27), and a locking ridge (28), which can be moved under a needle plate (29) of the needle bed (10), and,

further characterised in that the presser cam elements (57-59), which act on the depressor butt (26) of the locking jack (25), are adjustable in the plane of the cams transverse to the longitudinal direction of the needle bed.

4,686,840

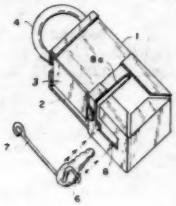
LOCK GUARD

Clark McCarroll, 168 Hillcrest Dr., Munhall, Pa. 15121

Filed Dec. 24, 1985, Ser. No. 945,820

Int. Cl.[4] E05B *67/38*

U.S. Cl. 70—54 **2 Claims**



1. A lock guard for a padlock comprising a rectangular container having an opening in about one half portion of its side for insertion of the body of the padlock and having on the same side in the other half portion thereof, a pair of slots at right angles to each other and below the position of the padlock, to enable a leverage clip to insert the key into one of said slots, turn it 90° in the plane of the key, then insert the key into the barrel of the padlock and thereafter turn said clip through the other of said slots to unlock the lock.

4,686,841

ROTATABLE MAGNETIC TUMBLER AND MAGNETIC LOCK CONTAINING SAME

Kurt Prunbauer, Herzogenburg, and Erich Csapo, Vienna, both of Austria, assignors to EVVA-Werk Spezialerzeugung von Zylinder- und Sicherheitsschlossern Gesellschaft mbH & Co. Kommanditgesellschaft, Vienna, Austria

Filed Oct. 7, 1985, Ser. No. 785,558

Claims priority, application Austria, Oct. 9, 1984, 3214/84

Int. Cl.[4] E05B *47/00*

U.S. Cl. 70—276 **8 Claims**

1. In a rotatable magnetic tumbler system for a magnetic lock, comprising:

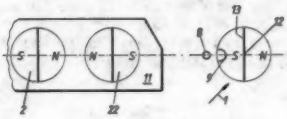
at least one rotatable magnetic tumbler whose rotary orientation about an axis of the tumbler is adjustable by a magnetic key corresponding to a preselected magnetic code, and

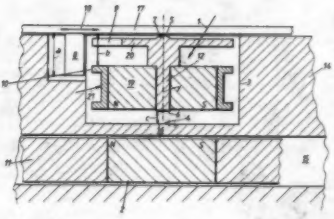
a contacting element engageable with said tumbler upon rotation by said tumbler in response to said code to enable manipulation of the lock by the key,

the improvement which comprises:

means for mounting said rotatable magnetic tumbler to permit axial displacement of said tumbler along said axis and in the direction of said axis;

means for mounting said element in the lock for movement in a direction transverse to said axis and radial of said tumbler upon insertion of a correct key into said lock and proper magnetic alignment of said key with said tumbler in accordance with said code, said tumbler having an axial end juxtaposed with and adapted to bear against said element;





a projection on said element extending therefrom perpendicular to said direction of movement by a distance a; and

means on said tumbler for blocking radial displacement of said element in the event of magnetic action of a key on said tumbler when said key is a wrong key and does not correspond to said code, by magnetic displacement of said tumbler in the direction of said axis toward bearing contact with said element, said means on said tumbler including an edge thereof spaced at a distance b from said axial end adapted to bear upon said element, where b is smaller than a by an amount which is less than a distance c equal to the axial displacement of said tumbler between axial positions thereof when said correct and wrong keys are respectively inserted in said lock.

4,686,842

SLIDING PLATE CONTROL DEVICE OF NUMERICAL LOCK FOR BRIEF CASE

Han-Jing Chen, 32-1, Yen Tso Lane, Hai pu Lee, Lu Kang County, Chang Hua Hsien, Taiwan

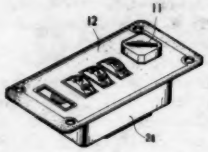
Filed May 22, 1986, Ser. No. 866,121

Int. Cl.[4] E05B *37/02*

U.S. Cl. 70—312 **3 Claims**

1. In a lock for a briefcase comprising a cover (12), a movable knob (11) on the outer surface of said cover, a sliding plate

(13) connected to said knob, a body (24) fixed to said cover, numerical dial wheels (15, 16, 17) located on said cover, sleeves (18 19, 20) for said dial wheels, a shaft (22) movable within said sleeves, a second plate (14) mounted on said shaft, the sliding plate (13) being slidably mounted on said shaft and a spring (21)



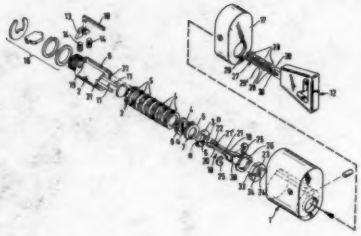
urging said sliding plate towards said second plate, the improvement which comprises two longitudinal cut-outs (221, 222) at one end of said shaft (22) said sliding plate (13) having two protrusions (131, 132) which fit in the space between said cut-outs, said knob (11) controlling the sliding plate to move to the left or to the right when force is applied to said plate (14).

4,686,843

CYLINDERLOCK-KEY-COMBINATION

Kaarlo Martikainen, and Kyösti Nevalainen, both of Joensuu, Finland, assignors to Oy Wärtsilä Ab, Helsinki, Finland

Filed Apr. 1, 1986, Ser. No. 846,879
Claims priority, application Finland, Apr. 11, 1985, 851441
Int. Cl.[4] E05B 29/02
U.S. Cl. 70—366 19 Claims



1. In combination, a disc cylinder lock and a key for operating the lock, the lock having a locked condition and an unlocked condition and comprising:

a cylinder housing formed with a groove at its interior,

an inner cylinder inside the cylinder housing and formed with a slot, the inner cylinder being held against turning relative to the cylinder housing when the lock is in its locked condition and being turnable relative to the cylinder housing when the lock is in its unlocked condition,

a set of discs inside the inner cylinder, each disc having a key opening and the key openings jointly forming a keyway which extends axially of the inner cylinder between an outer, key insertion, end and an inner end and the discs, when the lock is in the locked condition, having a key insertion position in which the key can be inserted fully into the keyway, the set of discs including locking discs and intermediate discs, each locking disc having a peripheral notch, the unlocked condition of the lock being the condition in which the peripheral notches of the locking discs are alinged with each other and form a channel at the position of the slot in the inner cylinder, and the locking discs including O-locking discs which turn continuously with the key when the key is turned in the lock,

a locking bar which, in the locked condition of the lock, is located partly in the groove of the cylinder housing and partly in the slot of the inner cylinder, thereby preventing the inner cylinder from being turned relative to the cylinder housing, the locking discs being turnable by means of the key to place the lock in the unlocked condition so that the locking bar can enter the channel formed by the peripheral notches of the locking discs and permit the inner cylinder to turn relative to the cylinder housing,

a ring-like limiting member for the keyway, the limiting member being arranged between the cylidner housing and the inner cylinder at the outer end of the keyway and being turnable by means of the key,

At least one return bar mounted in the inner cylinder and extending longitudinally across the set of discs and to which power is transmitted from the key by means of said O-locking discs for returning the locking discs from the unlocked condition of the lock to the locked condition, whereby the lock can be placed in the unlocked condition by turning the key in either direction from the key insertion position, and

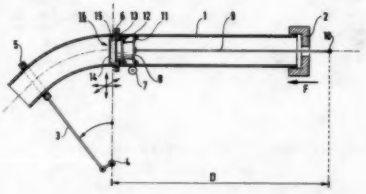
a guiding element arranged in the keyway and restricting the keyway and thereby determining at least partly the form of a key that can be inserted fully into the keyway, the guiding element being supported by the ring-like limiting member and including two guiding members extending longitudinally of the keyway across the set of discs and connected to each other at the inner end of the keyway by a body part, the guiding element guiding movement of the key in the keyway and thereby preventing uncontrolled scrambling of the locking discs and bending of the return bar by means of the key.

4,686,844

METHOD OF BENDING A THICK METAL TUBE, AND APPARATUS FOR IMPLEMENTING THE METHOD

Jacques Nicolas, Bondues, and Gilbert Degrande, Hem, both of France, assignors to Stein Industrie, Velizy Villacoublay, France

Filed Apr. 2, 1986, Ser. No. 847,384
Claims priority, application France, Apr. 4, 1985, 85 05171
Int. Cl.[4] B21D 7/12, 7/16
U.S. Cl. 72—13 2 Claims



1. In a method of bending a thick metal tube of constant cross-section about a center of curvature by localized heating of a narrow zone of the periphery of said tube by means of a heating collar surrounding said zone, by thrusting against one end of the tube and by holding its other end by means of a pivoting arm, wherein the temperature of the heated zone around the periphery of the tube is maintained substantially constant by detecting, at at least two points around said periphery, either the temperature of said heated zone or else the size of the gap between the heating collar and the periphery of said zone, a first one of said points being nearest to the center of curvature and the other point being opposite to the first point and furthest from said center of curvature, and by increasing or reducing the application of heat at one or other of these points depending on whether the temperature thereat is below or above, or on whether the gap thereat is above or below a reference value corresponding to a uniform temperature or to a uniform gap around the heated zone; the improvement comprising the step of disposing a layer of thermal insulation within the pipe and inside the heated zone, said layer of thermal insulation having a thickness sufficient to considerably

reduce the temperature gradient between inside and outside surfaces of the tube in the heated zone.

4,686,845

ROLL STAND, WITH TRAVELING CARRIAGE CONTAINING THE SET OF ROLLS WHICH CAN BE RUN OUT OF AND BACK INTO SAID STAND TRANSVERSELY TO THE DIRECTION OF ROLLING

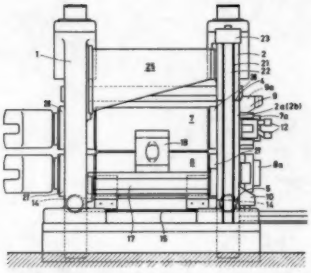
Alexandr Svagr, Hilden, Fed. Rep. of Germany, assignor to SMS Schloemann-Siemag Aktiengesellschaft

Filed Sep. 24, 1985, Ser. No. 779,670

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1984, 3436325

Int. Cl.[4] B21B *31/04, 31/10*

U.S. Cl. 72—238 **2 Claims**



1. A rolling mill stand comprising roll housings including pairs of pillar transoms (**1, 2**) connected together and forming windows, a set of rolls (**7, 8**) having a rolling direction between said set of rolls, roll installation parts (**26, 27**) associated with said rolls, a travelling carriage (**16**) movable transversely to the rolling direction of said rolls, said set of rolls and associated roll installation parts mounted on said travelling carriage, said roll installation parts (**26, 27**) connected together by a rest bar (**17**), roll fittings (**18**) mounted on said rest bar (**17**), one of said pairs of pillar transoms (**2**) comprises pillar transom sections interconnected by lateral traverses (**9, 10**) extending above and below said set of rolls (**7, 8**), sections of the roll housing (**2**) above and below the detachable pillar transom sections (*2a, 2b*) have longitudinal recesses (**21**) formed therein open in the direction of rolling for receiving tensionable tie rods (**22**), said tensionable tie rods being articulated at the roll housing (**2**) including said pillar transom section, a section of one of the roll housings (**2**) above the separable pillar transom sections (*2a, 2b*) is solidly connected with the other roll housing (**1**) by a traverse yoke (**25**), said pillar transom sections and lateral traverses mounted on said travelling carriage whereby said travelling carriage along with said set of rolls, roll installation parts, pillar transom sections and lateral traverses can be detached from said roll housings and removable therefrom on said travelling carriage.

4,686,846

AIR/FUEL RATIO MEASURING DEVICE

Yuichiro Aramaki, Tokyo, Japan, assignor to Kabushiki Kaisha Tsukasa Sokken, Tokyo, Japan

Filed Nov. 27, 1985, Ser. No. 802,458

Int. Cl.[4] G01N *27/12;* **G01M** *15/00*

U.S. Cl. 73—23 **4 Claims**

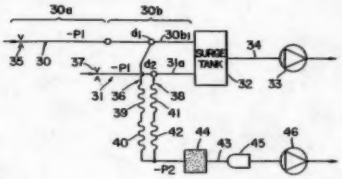
1. An air-fuel ratio measuring device for measuring an air-fuel ratio by measuring a residual component after air for dilution and sampled exhaust gas are mixed with each other, comprising:

an exhaust gas suction line for sucking the exhaust gas;

a dilution air suction line for sucking the dilution air, joining with the exhaust gas suction line;

two capillary tubes branching from the exhaust gas suction line and the dilution air suction line on an upstream side of a joining position of the two lines;

a mixture line extending from a joining point of the two capillary tubes and having a sensor for measuring the



residual component, whereby the value of said residual component is used to calculate the air-fuel ratio; and

a throttle nozzle provided on the exhaust gas suction line on an upstream side of a branch point of the capillary tube.

4,686,847

METHOD AND VIBRATING CAPACITOR APPARATUS FOR ANALYSIS OF A SUBSTANCE OR OF AT LEAST ONE COMPONENT OF A MIXTURE OF SUBSTANCES

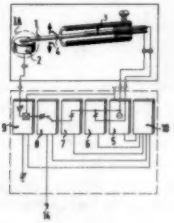
Karl-Heinz Besocke, Jülich, Fed. Rep. of Germany, assignor to Kernforschungsanlage Jülich Gesellschaft mit beschränkter Haftung, Jülich, Fed. Rep. of Germany

Filed Oct. 15, 1985, Ser. No. 787,264

Claims priority, application Fed. Rep. of Germany, Oct. 20, 1984, 3438546

Int. Cl.[4] G01N *27/22*

U.S. Cl. 73—23 **2 Claims**



1. Vibratory capacitor apparatus for measurement of the electron work function from surfaces or boundary areas, said apparatus having two electrodes that are movable relative one to the other and further comprising:

a surface layer applied onto at least one of said electrodes, facing the other of said electrodes and consisting of a sensor material of which the electron work function is affected by a substance to be detected in a gas or liquid, said sensor material being different from the material of the electrode on which it is applied; at least one of said electrodes having a said sensor material surface layer thereon also having a plurality of electrode portions, each of which is provided with a said sensor material layer, the sensor materials of the respective electrode portions being different, and

means for causing a gas or liquid to come in contact with said electrodes,

means for producing vibratory movement of at least one of said electrodes towards and away from the other of said electrodes

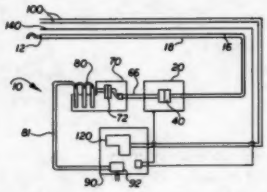
and means for measuring contact potential between said electrodes.

4,686,848

HIGH TEMPERATURE PARTICULATE FILTER MEDIA TEST UNIT

Robert F. Casselberry, Pittsburgh, and Robert C. Kania, Gibsonia, both of Pa., assignors to Umec Corporation, Latrobe, Pa.

Filed Nov. 20, 1984, Ser. No. 673,379
Int. Cl.[4] G01N *1/24*
U.S. Cl. 73—38 **12 Claims**



1. A device for evaluating the effectiveness of selected metallic high temperature filtering media using a gas stream from the same exhaust stack and at a temperature at which said filtering media will be commercially used, comprising:

a probe member insertable into said gas stream to withdraw a gas sample therefrom, said gas stream having an established temperature between about 300° F. and about 1500° F. and containing a quantity of particulates therein;

a gas sample transfer means connected at one end to said probe member for transferring said gas sample from said probe member, said gas sample transfer means including a temperature control means for maintaining said gas sample substantially at said established temperature;

a particulate filtering means connected to said gas sample transfer means to receive said gas sample and filter portions of said quantity of particulates therefrom; said particulate filtering means including selected metallic high temperature filtering media to be evaluated, a means for holding said selected metallic high temperature filtering media in the path of said gas sample, means for maintaining said gas stream and said selected metallic high temperature filtering media substantially at said established temperature, and an access means for permitting said selected metallic high temperature filtering media to be conveniently replaced with other selected metallic high temperature filtering media within said holding means to permit a comparison of the effectiveness of different selected metallic high temperature filtering media; and

a first means for measuring said established temperature within said exhaust stack, and wherein said temperature control means comprises a second means for measuring the temperature within said particulate filtering means, and a heating means for controlling the temperature within said particulate filtering means in response to the signal from said first and second measuring means.

4,686,849

METHOD FOR DETERMINING MINE ROOF COMPETENCY

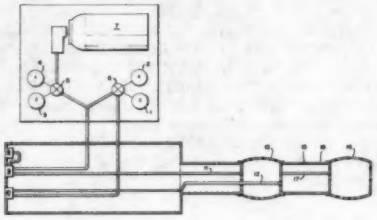
John B. Czirr, 1830 E. Yoon, Mapleton, Utah 84663

Filed Dec. 6, 1985, Ser. No. 805,772
Int. Cl.[4] G01N *15/08, 19/08*
U.S. Cl. 73—38 **12 Claims**

1. A method of assessing mine roof competency comprising the steps of:

(a) injecting gas under positive pressure into an isolated region of a borehole drilled in a mine roof to be tested; and

(b) measuring the rate of pressure loss through the borehole region;



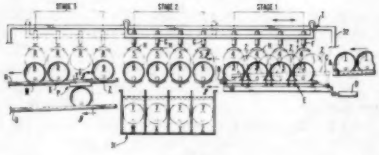
whereby high rates of pressure loss constitute an indication of a potentially dangerous mine roof condition.

4,686,850

METHOD AND APPARATUS FOR TESTING DRUMS

Robert G. Evans, P.O. Drawer 68, Harvey, La. 70059

Filed Mar. 31, 1986, Ser. No. 845,970
Int. Cl.[4] G01M *3/10*
U.S. Cl. 73—45.5 **20 Claims**



1. A method for simultaneously testing multiple drums for leaks wherein the drums have bung holes, comprising the steps of moving the multiple drum automatically into a predetermined area with a rolling-type conveyor feed, rotating and orienting the multiple drums so that the bung holes are in a 6 o'clock position, next moving the multiple drums to a position where air under pressure can be introduced into the multiple drums, introducing air into the multiple drums, shutting off the supply of air when the air pressure reaches a predetermined pressure, next releasing the multiple drums and lowering the multiple drums into a water-filled testing area, next having an operator simultaneously observe the multiple drums for leaks, and then mechanically lifting the multiple drums from the water filled area.

4,686,851

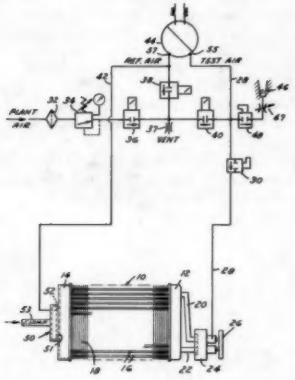
METHOD AND APPARATUS FOR DETECTING LEAKS

Albert E. Holm, 7259 First St., Marine City, Mich. 48039, and Grant A. Holm, 8454 Rattle Run, Richmond, Mich. 48062

Continuation of Ser. No. 579,701, Feb. 13, 1984, abandoned, which is a continuation of Ser. No. 332,885, Dec. 21, 1981, Pat. No. 4,430,891. This application Nov. 26, 1985, Ser. No. 802,042

Int. Cl.[4] G01M *3/32*

U.S. Cl. 73—49.2 **17 Claims**



1. The method of quickly determining leakage of a test chamber in a production environment, comprising the steps of:

providing a reference chamber having a volume-to-wall surface ratio of determined relation to the volume-to-wall surface ratio of the test chamber;

applying gas pressures to the reference and test chambers;

rapidly equalizing the gas temperatures in the respective chambers by exposing opposite sides of a wall of one of said chambers which is common to both chambers simultaneously to the gas in each chamber; and

comparing the pressures in the test and reference chambers and reading a relative change of such pressures as a function of leakage.

4,686,852

METHOD OF PREPARING MORTAR OR CONCRETE

Yasuro Ito, 38-16 Numabukuro 4-chome, Nakano-Ku, Tokyo 165; Yoshiro Higuchi, Tokyo; Takeshi Shiki, Funabashi; Yukikazu Tsuji, Ashikaga; Masanori Tsuji, Osaka, and Mitsutaka Hayakawa, Kamakura, all of Japan, assignors to Yasuro Ito and Taisei Corporation, both of Tokyo, Japan

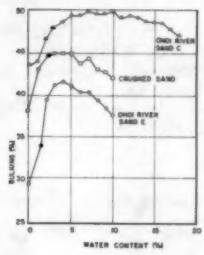
Division of Ser. No. 654,003, Sep. 13, 1984. This application Oct. 16, 1985, Ser. No. 788,227

Claims priority, application PCT Int'l Appl., Jan. 18, 1984, PCT/JP84/00008

Int. Cl.[4] G01N *15/00*

U.S. Cl. 73—61 R **1 Claim**

1. A method of measuring water percentages of a fine aggregate comprising the steps of prewetting the fine aggregate, containing the prewetted fine aggregate in an air-tightly closed container, applying a centrifugal force to said container over a predetermined period to remove a portion of a quantity of water deposited on the fine aggregate, measuring water content remaining in or on the fine aggregate after being subjected to the centrifugal force, and thus determining a percentage of water adhered to the fine aggregate and a percentage of water



of the fine aggregate in which interstice thereof is saturated with water while a surface thereof is dry.

4,686,853

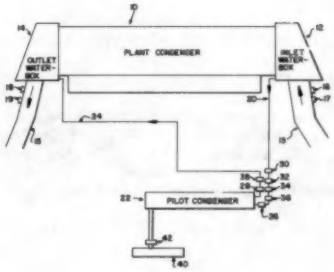
METHOD FOR THE PREDICTION AND DETECTION OF CONDENSER FOULING

Richard J. Sugam, 5 Hoagland Rd., Flemington, N.J. 08822, and Herbert S. Arnold, 2 Knapp Ave., Florham Park, N.J. 07932

Filed Jun. 17, 1985, Ser. No. 745,668

Int. Cl.[4] G01N *17/00*

U.S. Cl. 73—61.2 **10 Claims**



1. A method for the prediction and detection of fouling of condenser tubes during the operation of a condenser comprising:

measuring the drop in pressure across the condenser tubes of a substantially clean, unfouled main condenser unit to establish a baseline cooling water pressure drop for the main condenser unit; and

measuring the drop in pressure across the condenser tubes of a substantially clean, unfouled pilot-scale condenser unit which is operated so as to approximate the environment on the cooling water side of the plant condenser to establish a baseline cooling water pressure drop for the pilot-scale condenser unit; and

operating said main condenser unit and said pilot-scale condenser unit while continuously measuring the pressure drop across each unit such that an approximately simultaneous and proportional increase in pressure drop across both the main condenser and the pilot-scale condenser indicates that the condenser tubes are becoming microfouled and that an increase in pressure drop across only one unit indicates that only the unit demonstrating the increased pressure drop is subject to macrofouling and an approximately simultaneous but significantly disproportionate pressure drop in both units indicates that (1) both units are becoming microfouled and (2) the unit with

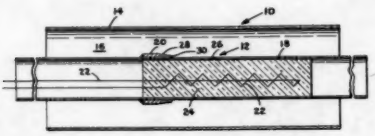
the greater increase in pressure drop is also subject to macrofouling.

4,686,854

PROCESS AND APPARATUS FOR MEASURING CORROSION RATE OF A HEAT TRANSFER SURFACE

Kark W. Herman, Somerset, N.J., assignor to Drew Chemical Corporation, Boonton, N.J.

Filed Jun. 18, 1981, Ser. No. 274,880
Int. Cl.[4] G01N *17/00*
U.S. Cl. 73—86 **16 Claims**



1. An apparatus for determining the corrosion rate of a fluid to a material, which comprises:

a heat transfer assembly to be disposed within a conduit of a piping assembly and including a cylindrically-shaped member having a heating element; and

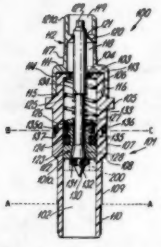
a pre-weighed metallic sleeve member press fitted about said cylindrically-shaped member, said metallic sleeve member and said cylindrically-shaped member being formed of like metal.

4,686,855

INFLATION PRESSURE INDICATOR FOR VEHICLE TIRES

Noel Smith, 112 Federation Drive, Bethania Waters, Queensland, 4205, Australia

Continuation-in-part of Ser. No. 644,956, Aug. 28, 1984, abandoned, which is a continuation-in-part of Ser. No. 385,376, Aug. 26, 1982, abandoned. This application Sep. 26, 1985, Ser. No. 780,693
Claims priority, application PCT Int'l Appl., Aug. 26, 1985, PCT/AU85/00202
Int. Cl.[4] B60C *23/04*; G01L *7/16, 19/04*
U.S. Cl. 73—146.8 **10 Claims**



1. An inflation indicator for pneumatic tires for vehicles, said indicator including:

a body mountable on a wheel fitted with a tire;

an axial bore in the body adapted to communicate with the interior of the tire;

a piston means slidably mounted in the axial bore;

sealing means between the piston means and the axial bore;

compression means in the body acting on the piston means in opposition to the inflation pressure in the tire;

datum means in or on a substantially transparent portion of the body; and

visual indicator means on the piston means, so arranged that at a preselected cold inflation pressure of the tire, the piston means will be moved against the compression means to a position where the visual indicator means is adjacent the datum means; characterized in that:

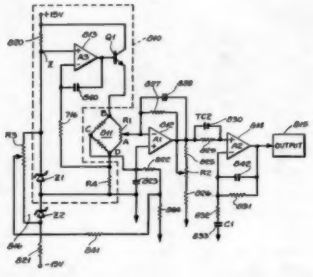
as the inflation pressure in the tire increases due to heat generated in the tire, the increased inflation pressure moving the piston means against the compression means, the heat transmitted to the body causes a portion of the body between the wheel and the datum means to increase in length in an axial direction, but without any increase in the diameter of the axial bore so that the visual indicator means remains adjacent the datum means to indicate the cold inflation pressure of the tire, the body acting as a temperature compensator for the increase hot inflation pressure in the tire relative to the cold inflation measure.

4,686,856

MASS FLOW METER

Randall J. Vavra, 3131 Arlington Ave., Riverside, Calif. 92506, and Michael J. Doyle, 2705 Calle Lona, Riverside, Calif. 92503

Continuation of Ser. No. 470,097, Feb. 28, 1983, abandoned. This application Apr. 9, 1986, Ser. No. 851,262
Int. Cl.[4] G01F *1/68*
U.S. Cl. 73—204 **24 Claims**



1. A fluid mass flow meter comprising:

a tube having therethrough a flow path for the fluid;

a sensor disposed adjacent the tube, in thermal connection therewith, and along said fluid flow path, the sensor having distal and proximal extremities, the sensor having a first electrical terminal at its distal extremity, a second electrical terminal at its proximal extremity, and a third electrical terminal at an intermediate point between the first and second terminals, the first and third terminals defining a first sensor unit, the second and third terminals defining a second sensor unit, each of said units operative, in response to a change in the temperature thereof, to change the electrical resistance therethrough;

thermally conductive means in thermal communication with the tube at a first point adjacent said distal extremity and at a second point adjacent said proximal extremity, operative to prevent said first point from having a different temperature than said second point;

resistance means having a first connection at a distal extremity thereof, a second connection at a proximal extremity thereof, and a third connection at an intermediate point between the first and second connections, said first and second connections being in electrical communication with the first and second terminals of the sensor, respectively, the resistance means and the sensor in combination defining a bridge;

a current source, operative to cause a current to flow through the bridge;

differential amplifier means having a first input in electrical communication with the third sensor terminal, a second input in electrical communication with the third resistance connection, and an output;

frequency compensating amplifier means in electrical communication with the differential amplifier means and having a final output and operative to produce at the final

output a signal indicative of the rate of flow of the fluid through the tube;

a feedback element in a negative feedback relationship with the final output of the frequency compensating amplifier and a feedback input thereof; and

frequency compensation means, in electrical communication with the frequency compensating amplifier means and operative to alter the gain thereof as a predetermined function of the rate of change of the signal being amplified, said function being a positive function over a part of its range.

4,686,857

METHOD AND APPARATUS FOR EVALUATING THE PERFORMANCE OF DIELECTRIC SUBSTANCES

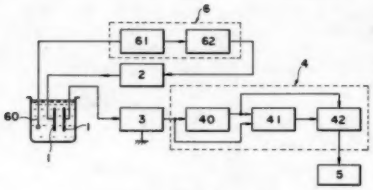
Takayuki Kato, Aichi, Japan, assignor to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan

Filed Mar. 1, 1984, Ser. No. 585,257

Claims priority, application Japan, Mar. 4, 1983, 58-36384; Mar. 7, 1983, 58-37210; Mar. 14, 1983, 58-42978; Mar. 14, 1983, 58-42979; Mar. 14, 1983, 58-42980; Apr. 8, 1983, 58-62691; Jul. 4, 1983, 58-121411

Int. Cl.[4] G01F *23/26*; G01R *27/26*

U.S. Cl. 73—304 R **42 Claims**



1. A method of evaluating the quality of a dielectric fluidic substance, comprising the steps of:

applying a pulsed voltage to at least a pair of electrodes arranged so as to be in contact with said dielectric fluidic substance, wherein said pulsed voltage has a fixed amplitude and fixed time duration;

detecting the transient response current flowing between said electrodes depending upon the quality of the dielectric fluidic substance disposed between said electrodes when said pulsed voltage is applied,

detecting and processing the transient response current to extrapolate a steady-state current over a fixed period of time;

measuring and comparing with a predetermined reference value at least one of a peak value of said extrapolated steady-state current, a difference between the peak value and a value at a fixed period of time after the peak value has been detected and a ratio of the peak value so detected and the difference between the peak value and a value at a fixed period of time after the peak value has been detected; and

displaying the value of the measured and compared value.

4,686,858

FLIGHT INSTRUMENT USING LIGHT INTERFERENCE FOR ACCELERATION SENSING

Ralph P. Muscatell, 2007 N.E. 20th Ave., Ft. Lauderdale, Fla. 33305

Division of Ser. No. 725,226, Apr. 19, 1985. This application Jun. 25, 1986, Ser. No. 878,364

Int. Cl.[4] G01P *15/13*

U.S. Cl. 73—517 B **5 Claims**

1. Accelerometer comprising:

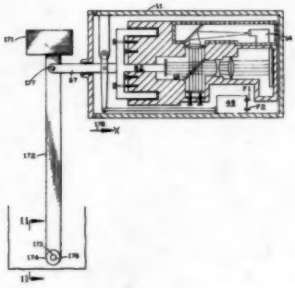
at least one mass producing an acceleration force when accelerated;

a laser generating a laser light beam;

a light interferometer for receiving said light beam and creating a movable interference pattern and having a plurality of mirrors for reflecting said light beam;

a motion sensing photo detector for receiving said interference pattern and producing motion-responsive output in response to the movement of said interference pattern;

amplifying means connected to said motion-sensing detector for increasing the output from said motion-sensing detector and having amplified output;



a linear motor connected to said amplified output for producing an output force that is proportional to said amplified output;

first linkage means connecting said mass with a first one of said plurality of mirrors for producing a movement of said interference pattern in a first direction;

second linkage means connecting said linear motor to said first linkage means for moving said interference pattern in the opposite direction of said first direction; and

an acceleration display showing the degree of acceleration in acceleration units.

4,686,859

LOAD INDICATING MEMBER, APPARATUS AND METHOD

Paul Wallace, Furlong, Pa., assignor to SPS Technologies, Newtown, Pa.

Continuation of Ser. No. 670,260, Nov. 12, 1984. This application Oct. 31, 1986, Ser. No. 926,309

Int. Cl.[4] G01L *1/04*

U.S. Cl. 73—761 **27 Claims**

1. A load indicating member comprising:

a shank, which, when stressed longitudinally, is subject to elastic deformation such that one portion thereof moves relative to another portion thereof;

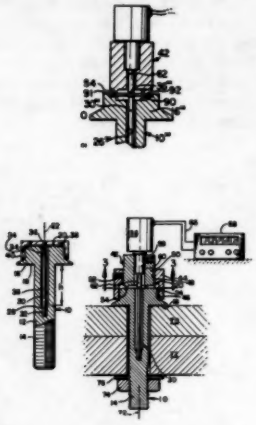
a recess formed adjacent one longitudinal end of said shank;

a first flat surface formed in the base of said recess;

an indicator pin having one longitudinal end disposed adjacent said first flat surface and an other longitudinal end disposed remote therefrom, said other longitudinal end being secured to said shank at a location remote from said first flat surface, said pin being unaffected by said elastic deformation of said shank; and

a second flat surface formed at said one longitudinal end of

said pin, said second flat surface being substantially parallel with said first flat surface when said shank is unstressed, said second flat surface providing a reference for measurement of the elongation of said shank.

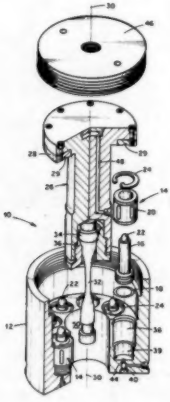


4,686,860

SELF-ALIGNING HYDRAULIC PISTON ASSEMBLY FOR TENSILE TESTING OF CERAMIC

Kenneth C. Liu, Oak Ridge, Tenn., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 17, 1986, Ser. No. 853,106
Int. Cl.[4] G01N *3/02*
U.S. Cl. 73—856 **3 Claims**



1. A grip for tensile testing of ceramic specimens comprising:

(a) an annular support housing defining a central cavity;

(b) a multiplicity of hydraulic cylinder-piston assemblies equally spaced in a concentric circular array within said support housing about said central cavity;

(c) a means for supplying pressurized oil to each of said hydraulic cylinder-pistons at the same oil pressure; and

(d) a pull rod having a flanged end resting on said cylinder-piston assemblies and a gripper end for gripping said ceramic tensile specimen; said pull rod extending through said central cavity in said support housing.

4,686,861

GASKET TYPE PRESSURE SENSOR

Hiroaki Morii, Aichi, Japan, assignor to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Sep. 25, 1985, Ser. No. 780,113
Claims priority, application Japan, Sep. 26, 1984, 59-145424
Int. Cl.[4] G01L *1/16, 23/10*
U.S. Cl. 73—862.68 **4 Claims**

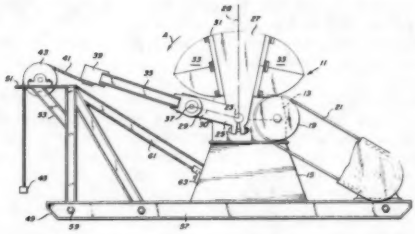
1. A gasket type pressure sensor comprising a presser metal portion and a plurality of piezoelectric elements piled up on said presser metal portion to form an integrated body, and a metal case covering at least three sides of an outer surface of the integrated body, said presser metal portion and said metal case together completely surrounding said plurality of piezoelectric elements, said metal case including a seam extending along a portion thereof and being wrapped around said integrated body, said seam being positioned on a fourth side of said integrated body adjacent the presser metal portion, wherein, during operation of said sensor, pressure is applied to said metal case directly, and to said presser metal portion indirectly through said metal case to seal the sensor along the seam.

4,686,862

LOW PROFILE PUMP JACK

Steven M. Mair, Watauga, and Clyde S. Durham, Keller, both of Tex., assignors to Mark IV Industries, Inc., Forth Worth, Tex.

Continuation-in-part of Ser. No. 442,426, Nov. 17, 1982, abandoned. This application Jul. 13, 1983, Ser. No. 513,421
Int. Cl.[4] F04B *47/02*
U.S. Cl. 74—44 **7 Claims**



1. A pump jack for reciprocating a string of rods in a well, comprising in combination:

support means for rotatably supporting a guide wheel above the well;

drive means for carrying and rotating a drive shaft, said drive shaft having an axis parallel with and lower than the axis of the guide wheel;

a crank arm mounted to each end of the drive shaft for rotation therewith;

counterweight means mounted to each crank arm for assisting in lifting the rods, the counterweight means having a center of gravity offset from the axis of the drive shaft;

pitman arms, each pitman arm having its inner end rotatably

secured to one of the crank arms at a pivot point offset from the axis of the drive shaft;

a cross bar secured to the outer ends of the pitman arms;

a flexible linkage extending over the guide wheel, said linkage having one end carried by the cross bar and the other end adapted to be secured to the string of rods; and

the crank arm being constructed such that a radial line emanating from said drive shaft and passing through the pivot point of the pitman arms will be substantially tangent to the top of the guide wheel when the counterweight means is not more than 5° from its uppermost position, and the angle between a radial line interconnecting the axis of the drive shaft with the connection to the pitman arm to the counterweight member centerline is in the range of 72° to 75°;

all of the above being mounted on a single skid with said drive shaft being centrally located along the length of the skid remote from said guide wheel.

4,686,863

ROTARY ACTUATOR

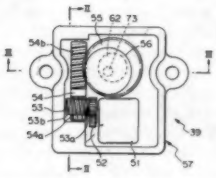
Masaru Inoue; Masao Ida, both of Kanagawa, and Takao Kohara, Tokyo, all of Japan, assignors to Tokico Ltd. and Jidosha Denki Kogyo Kabushiki Kaisha, both of Kanagawa, Japan

Filed Jan. 31, 1986, Ser. No. 824,965

Claims priority, application Japan, Feb. 8, 1985, 60-16600[U]; Jun. 20, 1985, 60-93331[U]

Int. Cl.[4] F16H *1/16;* F16F *9/46*

U.S. Cl. 74—425 **12 Claims**



1. A rotary actuator comprising a first rotor rotatable around a first axis and having an axial end surface with a plurality of circumferentially spaced and axially projecting first projections extending from said axial end surface, a second rotor rotatable around a second axis which is not coincident with said first axis, said second rotor having an axisl end surface with a plurality of circumferentially spaced and axially projecting second projections extending from said axial end surface thereof, and a rotating mechanism being connected to said second rotor to rotate said second rotor around said second axis, said second projections projecting in a direction opposite to that of said first projections and engageable therewith whereby one of said second projections engages with one of said first projections to rotate said first rotor through a predetermined angular rotation when said second rotor is rotated by said rotating mechanism.

3. A rotary actuator comprising:

a first rotor rotatable around a first axis and having on one end surface thereof a plurality of circumferentially spaced and axially projecting first projections;

a second rotor rotatable around a second axis which is eccentric to the first axis and having on one end surface which faces the one end surface of the first rotor a plurality of circumferentially spaced and axially projecting second projections, each of said second projections being selectively engageable with said first projections and adapted to disengage therewith at a predetermined position, whereby said first rotor is rotated by a predetermined angular rotation;

an electrically powered rotating mechanism connected to said second rotor to rotate said second rotor around said second axis;

an electric circuit means connected to said rotating mechanism;

a member of electrically conductive material having an electrically non-conductive portion and being adapted to rotate in unison with said first rotor;

a first brush connected to said electric circuit means and adapted to contact with said member along a path which does not pass through said non-conductive portion;

a plurality of second brushes selectively connected to said circuit means and adapted to contact with said member along paths which pass through said non-conductive portion;

said first rotor being rotated by said predetermined angular rotation by engagement of one of said first projections with one of said second projections when a selected one of said second brushes which is out of contact with said non-conductive portion is connected to said circuit means so as to energize said rotating mechanism;

said non-conductive portion being located such that said selected one of said second brushes contacts with said non-conductive portion to break said circuit means when said engagement between a respective one of said first projections and a respective one of said second projections is released at said predetermined position.

4,686,864

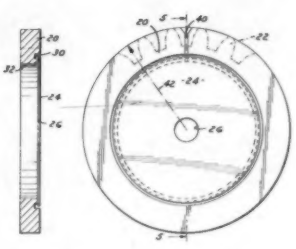
FLYWHEEL STARTER GEAR AND METHOD OF MAKING

Robert E. Roseliep, 6 Elmsleigh La., Grosse Pointe, Mich. 48230

Filed Jan. 31, 1986, Ser. No. 824,377

Int. Cl.[4] F16H *55/00;* B21D *53/28*

U.S. Cl. 74—431 **3 Claims**



1. A flywheel starter gear which comprises a circular strip of steel having a rectangular cross-section with an outer peripheral diameter and an inner diameter, a plurality of spaced teeth formed on the outer peripheral diameter, and a center support disc having an annular surface friction welded to an annular radial surface adjacent the inner diameter of said strip, said annular radial surface of said strip has an annular groove spaced radially outwardly of the inner diameter of said circular strip forming an annular ridge on said surface, said disc having an outer diameter and a surface adjacent said outer diameter overlying said annular ridge.

4,686,865

PUSH BUTTON SHIFT CONTROL FOR BICYCLES AND THE LIKE

Efrain Rivera, 58 E. 208th St., Bronx, N.Y. 10467

Filed Oct. 20, 1986, Ser. No. 920,980

Int. Cl.[4] G05G *1/02, 5/08, 11/00*

U.S. Cl. 74—475 **8 Claims**

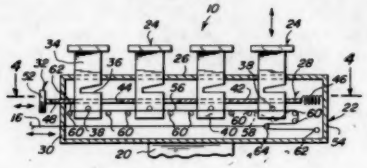
1. A shift control device for a bicycle having a control cable and gears, said device comprising:

(a) a clamp member for attachment to said bicycle;

(b) a housing mounted onto said clamp member;

(c) a plurality of push buttons extending upwardly through the top of said housing;

(d) means for locking each of said push buttons in a down position when each of said push buttons is depressed in sequence, to move the control cable extending outwardly



through the side of said housing, a predetermined distance back into said housing to operate the gears; and

(e) means for releasing said push buttons so that said push buttons and the control cable can return to a previous position.

4,686,866

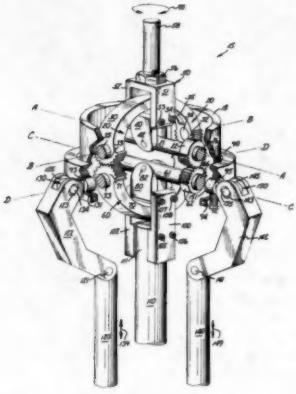
COMPACT ROBOT WRIST ACUATOR

Mark E. Rosheim, 1565 St. Paul Ave., St. Paul, Minn. 55116

Filed Jan. 21, 1986, Ser. No. 820,678

Int. Cl.[4] G05G *11/00*

U.S. Cl. 74—479 **23 Claims**



1. A mechanical joint comprising:

housing means having an open interior portion and open at both a top and a bottom end;

a first and a second gimbal assembly rotatably mounted within the interior portion of the housing means each gimbal assembly having means for transferring motion to the other gimbal assembly;

drive means operatively connected to the housing for effecting selective movement of the first and second gimbal assemblies;

rotation means connected to the first gimbal assembly for transmitting rotational motion to the housing means; and

output means fixedly connected to the second gimbal assembly for transmitting the desired motion of the mechanical joint.

4,686,867

BICYCLE PEDAL AND SHOE FASTENING COMBINATION

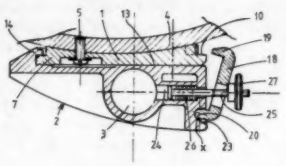
Jean Bernard, Cluses, and Michel Mercier, Coulanges les Nevers, both of France, assignors to Ste Look, Nevers, France

Continuation of Ser. No. 678,503, Dec. 5, 1984, abandoned. This application Jun. 16, 1986, Ser. No. 875,240

Claims priority, application France, Dec. 16, 1983, 83 20185

Int. Cl.[4] G05G *1/14*; A43B *5/00*

U.S. Cl. 74—594.6 **6 Claims**



1. The combination of a shoe sole, a bicycle pedal having a front and rear end and a top face, and a device for fastening the shoe sole to the pedal, said device comprising a mounting support fixed to the shoe sole, the pedal comprising retaining means retaining said mounting support on said pedal, said retaining means comprising a claw which is mounted on said rear end of said pedal movably in the longitudinal direction of the bicycle and is urged in the forward direction by a resilient member in order to engage a rear portion of said mounting support, all portions of the mounting support being in front of the claw, said claw and said mounting support having interengaging control surfaces shaped in such a manner as to ensure that a movement of rotation of the mounting support in its own plane produces a rearward displacement of the movable claw and permits lateral dis engagement of the shoe sole, wherein the pedal comprises fixed bearing means cooperating with said rear portion of said mounting support to restrict any displacement of said mounting support relative to said pedal in a rearward direction while permitting rotation of said mounting support in its own plane, said bearing means comprising a pair of stops which project upwardly from said top face of the pedal on opposite lateral sides of the movable claw and engage with bearing faces of complementary shape formed at said rear end of the mounting support, the pedal having a fixed front retaining claw which retains a laterally central portion of said front of the mounting support and defines a center of rotation for said mounting support when it rotates in its own plane, said bearing faces being portions of a cylinder which is centered on said center of rotation.

4,686,868

SOUNDPROOFED GEAR BOX

Günther Heidrich, Ortwang 38, 8978 Burgberg-BRD, Fed. Rep. of Germany

Filed Jun. 5, 1986, Ser. No. 871,096

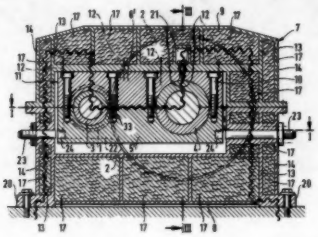
Claims priority, application Fed. Rep. of Germany, Jun. 7, 1985, 3520501

Int. Cl.[4] F16H *57/02*

U.S. Cl. 74—606 R **8 Claims**

1. A soundproofed gear box, in particular a transmission gear box with moving mechanical parts, which are enclosed over a plurality of bearing carriers by a housing comprising a first portion which is provided with mounting feet, and a second portion mating with said first portion, said bearing carriers (**5**, **6**, **5'**, **6'**, **25** and **26**) being only connected with said second

portion of said housing (9, 27) and are remote from the portion provided with said mounting feet (20), providing a lengthy



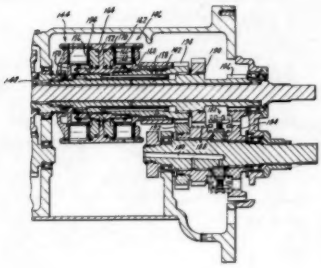
sound transmission path from the bearing carriers to the mounting feet.

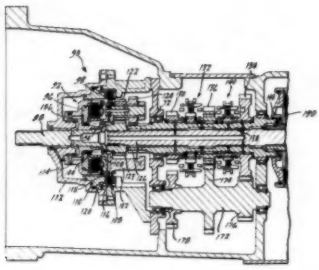
4,686,869

RATIO CHANGE GEAR SPEED SYNCHRONIZING IN A TRACTOR TRANSMISSION

Rudolf Beim, Southfield, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Jan. 13, 1986, Ser. No. 818,448
Int. Cl.[4] F16H *3/02*
U.S. Cl. 74—745 **8 Claims**





1. A transmission for producing multiple speed ratios comprising:

a first shaft adapted for connection to a power source, an input shaft, a second shaft, a third shaft, a fourth shaft, a countershaft, and an output shaft;

first gearing means for producing multiple speeds of the input shaft in relation to the speed of the first shaft;

first clutch means for selectively driveably connecting the first shaft to the input shaft through the first gearing means, whereby the input shaft is driven at various speeds in accordance with the selected operation of said first clutch means;

a second gearing means including multiple pairs of meshing gears and pinions carried on the input shaft the second shaft and the countershaft;

first synchronizer clutch means for driveably connecting the gear-pinion pairs of the second gear means selectively to the second shaft;

second clutch means for driveably connecting the second shaft to the third shaft;

third clutch means for driveably connecting the second shaft to the fourth shaft;

third gearing means including multiple gear-pinion pairs including gears carried on the third shaft and fourth shaft meshing with pinions carried on the output shaft; and

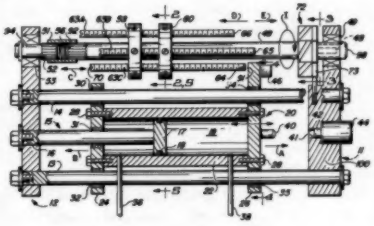
second synchronizer clutch means for driveably connecting the gear-pinion pairs of the third gearing means selectively to the output shaft.

4,686,870

POSITION INCREMENTER

James F. Mack, 3695 East Industrial Dr., Flagstaff, Ariz. 86002

Filed Nov. 4, 1985, Ser. No. 794,791
Int. Cl.[4] F16H *35/08*
U.S. Cl. 74—828 **3 Claims**



1. In combination with reciprocating carriage apparatus, said apparatus including

a housing,

an elongate rod mounted in said housing and having a longitudinal axis, and

a carriage mounted on said rod to slidably linearly reciprocate therealong between a plurality of operative positions, including

a primary base position,

a secondary position spaced a first distance away from said primary base position, and

a tertiary position spaced a second distance away from said primary base position, said second distance differing from said first distance,

said carriage generally moving

in a first direction of travel when moving from said primary base position to one of said secondary and tertiary positions, and

in a second direction of travel when moving from one of said secondary and tertiary positions to said primary base position,

means for varying the distance said carriage linearly travels in said first direction of travel away from said primary base position, said means including

(a) a support member rotatably mounted on said housing and spaced away from said elongate rod;

(b) a stop surface on said carriage spaced away from said elongate rod in a direction generally toward said support member;

(c) at least a pair of secondary stop surfaces mounted on said support member for rotation therewith and operatively associated with said carriage stop surface, each of

said secondary stop surfaces movable between at least two operative index positions,

(i) a first operative position in which said secondary stop surface is positioned to contact said carriage stop surface when said carriage is moving in said first direction of travel and to stop said carriage in one of said secondary and tertiary positions, and

(ii) a second operative position in which said secondary stop surface will not contact said carriage stop surface when said carriage is moving in said first direction of travel;

(d) a control member carried on said support member for rotating said member when said carriage is moving to said base position from one of said secondary and tertiary operative positions in said second direction of travel, said control member having a first contact surface generally at an angle with respect to said longitudinal axis of said elongate rod; and,

(e) a second contact surface on said carriage

(i) spaced away from said elongate rod in a direction generally toward said support member,

(ii) linearly reciprocating with said carriage, and

(iii) shaped and dimensioned to

engage and slidably move over said first contact surface when said carriage and second contact surface are moving in said second direction of travel toward said primary base position, and

rotate said control member and support member and simultaneously rotate each of

said secondary stop surfaces between said first and second operative positions,

said carriage providing the motive power to rotate said control member and support member.

4,686,871

POWER DELIVERY SYSTEM HAVING A CONTINUOUSLY VARIABLE RATIO TRANSMISSION

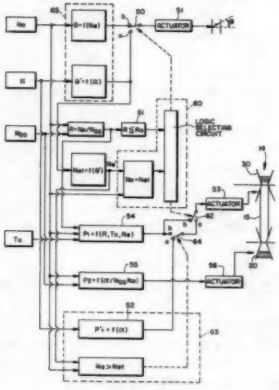
Hideyaki Kobayashi, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Oct. 1, 1984, Ser. No. 656,776

Claims priority, application Japan, Sep. 30, 1983, 58-182543

Int. Cl.[4] B60K *41/12*

U.S. Cl. 74—866 **19 Claims**



9. A power delivery system for a power driven device comprising:

a prime mover;

a continuously variable ratio transmission coupled to said prime mover;

coupling means for coupling said prime mover and said transmission;

an output shaft coupled to said transmission for receiving power from said prime mover through said transmission;

fuel delivery system means for delivering a variable quantity of fuel to said prime mover;

command means for commanding a desired power delivery system performance;

said transmission having a variable driver side receiving power from said prime mover and a variable driven side delivering power to said output shaft, the speed of said prime mover varying as a function of transmission ratio;

actual system performance measuring means for measuring the actual performance of the power delivery system;

speed measuring means for measuring the speed of said prime mover;

means for comparing the measured prime mover speed to a target value speed;

ratio control means operatively coupled to said command means and said actual system performance measuring means for controlling the ratio of said transmission by controlling one side of said transmission as a function of the desired system performance commanded by said command means and controlling the other side of said transmission as a first control function of the measured actual system performance when said measured prime mover speed equals said target prime mover speed value, and as a second control function of commanded system performance when said measured prime mover speed exceeds said target speed value, whereby the load on said prime mover is adjusted to converge said prime mover speed with said target prime mover speed.

4,686,872

AUTOMATIC TRANSMISSION WITH ANTI CREEP DEVICE

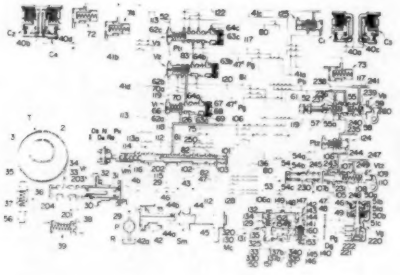
Takashi Aoki, Fujimi; Yoichi Sato, Wako, and Yukihiro Fukuda, Asaka, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 13, 1984, Ser. No. 650,359

Claims priority, application Japan, Sep. 20, 1983, 58-145808[U]; Sep. 27, 1983, 58-178499

Int. Cl.[4] B60K *41/04*

U.S. Cl. 74—869 **6 Claims**



5. An automatic transmission, comprising:

(a) a fluid coupling;

(b) a mechanical transmission mechanism coupled to said fluid coupling, comprising a plurality of power trains and a plurality of friction engagement mechanisms, various ones of said power trains being selectively engageable according to selective supply of actuating fluid pressure to selective ones of said friction engagement mechanisms to provide various speed stages including a lowest speed stage; and

(c) a transmission control system comprising:

(d) means for producing a signal representative of engine output; and

(e) an anti creep means for varying the actuating hydraulic fluid pressure for a one of said friction engagement mechanisms which is engaged for providing said lowest speed stage, according to said signal representative of engine output, from a low value when engine output is low upward as engine output increases;

(f) said anti creep means comprising:

(g) an anti creep valve having at least a first pressure chamber and a second pressure chamber,

(h) an override valve having at least a first pressure chamber and a second pressure chamber,

(i) anti creep valve means for communicating hydraulic fluid pressure from said one of said friction engagement mechanisms to said override valve,

(j) override valve means for communicating the hydraulic fluid pressure from said one of said fluid engagement mechanisms to said anti creep valve, said communicating means integral with said override valve operative to selectively permit anti creep action,

(k) a fluid conduit system providing communication between said first pressure chamber of said anti creep valve and said second pressure chamber of said override valve for substantially terminating anti creep action when said engine output is at a predetermined level,

(l) means for varying the rate of application of anti creep action, and

(m) said varying means comprising a throttle means and one-way valve means communicating with said anti creep valve for rapidly terminating anti creep action when said engine output is at a predetermined level and slowly restoring anti creep action when said engine output is below said predetermined level.

4,686,873

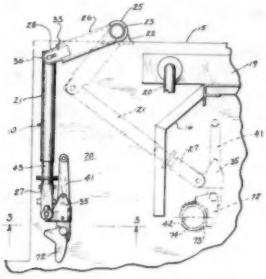
CASING TONG ASSEMBLY

David M. Lang, South Milwaukee, and Richard W. Lewitzke, Franklin, both of Wis., assignors to Becor Western Inc., South Milwaukee, Wis.

Continuation of Ser. No. 764,553, Aug. 12, 1985, abandoned. This application Nov. 25, 1986, Ser. No. 935,159

Int. Cl.[4] B25B *13/50*

U.S. Cl. 81—57.35 **15 Claims**



1. An adjustable casing tong and pivoting arm for disconnecting a drill pipe from a drill string of pipe or a drill bit in a drilling apparatus comprising:

a support column connected to the drilling apparatus;

an arm member supported at one end by said support column for movement in a direction along a longitudinal axis of said support column and for pivotal movement with respect to said column, a first flange member connected to said arm member at the opposite end of said arm member;

a wrist member including a second flange member for selective adjustable rotation with respect to said first flange member;

means to secure said first and second flange members to one another in a selected fixed position;

said wrist member including indexing means having at least one plate member connected to said second flange member and a connector portion pivotally attached to said plate member, openings extending through said plate member and said connector portion and a pin for engagement with selected openings such that said plate member and said connector portion are pivotally attached for indexing said plate member and said connector portion thus providing a pivoting of said connector portion of said wrist member with respect to said arm member; and

gripping tong means operatively connected to said connector portion of said wrist member for engaging drill pipe.

4,686,874

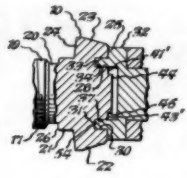
TAMPER-PROOF BOLT AND TAMPER-PROOF BOLT-KEY COMBINATION

Durham S. McCauley, Boston, and Miller G. McCalmon, Orchard Park, both of N.Y., assignors to McGard, Inc., Buffalo, N.Y.

Filed Dec. 23, 1985, Ser. No. 812,232

Int. Cl.[4] B25B *13/48, 15/02;* **F16B** *23/00, 35/06*

U.S. Cl. 81—461 **7 Claims**



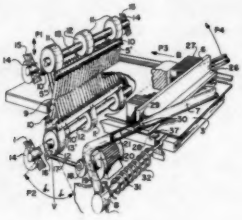
7. A self-aligning fastener and key construction comprising: a head on said fastener, a face on said head, an undulating curvilinear groove in said face, an island within said groove, an outer side in said groove facing said island, a plurality of lobes with portions therebetween on said island defining an inner side of said undulating curvilinear groove, a boss of cylindrical configuration on said island extending axially outwardly of said lobes and having a first radial dimension, a side on said boss, said portions of said inner side and portions of said side on said boss being in axial alignment with each other, said portions of said island between said lobes having a second radial dimension which is substantially equal to said first radial dimension; and a key having an undulating curvilinear ridge thereon of complementary mating shape to said undulating curvilinear groove, and an inner side on said ridge for engaging said lobes, said inner side of said ridge including spaced innermost portions of which lie on a circle having a third radial dimension which is only slightly larger than said first radial dimension so that said spaced innermost portions of said ridge center said key relative to said head and permit said key to rotate relative to said head by riding on said side of said boss until said undulating curvilinear ridge is aligned with said undulating curvilinear groove and moves axially into driving relationship therewith.

4,686,875

SLICING APPARATUS

Lodewijk C. Rijkaart, 29, Kijftenbeltlaan, 3871 BC Hoevelaken, Netherlands

Filed Nov. 15, 1985, Ser. No. 798,375
Claims priority, application Netherlands, Nov. 15, 1984, 8403503
Int. Cl.[4] B26D 1/11
U.S. Cl. 83—425.2 6 Claims



1. Apparatus for slicing bread products comprising:
a stand with a support surface for the product to be sliced;
two groups of parallel cutting blades, each group being driven with an oscillating motion transverse to the support surface, said two groups being arranged with the blades of the two respective groups alternately next to one another, the cutting blades of one group being located at a first angle with the cutting surface, the cutting blades of the other group being located at a second angle with the cutting surface, said first and second angles being different, the one group of cutting blades crossing the other group of cutting blades at a location displaced from the support surface;
a first holder for engaging one end of the one group of cutting blades, a second holder for engaging one end of the other group of cutting blades;
at least one flexible member for connecting the first and second holders;
a guidance member for guiding the at least one flexible member, said guidance member being located intermediate the first and second holders and having the at least one flexible member partially looped therearound; and
a press organ movable toward and away from the two groups of cutting blades for moving the bread products.

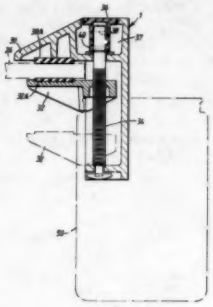
4,686,876

APPARATUS FOR CUTTING SHEET MATERIAL

Kenneth J. Hume, deceased, late of Chalfont St. Giles (by Catherine G. Hume, executor), and Laurence N. Ogborne, Colmworth, both of United Kingdom, assignors to Rotatrim Limited, Luton, England

Filed Dec. 12, 1985, Ser. No. 808,157
Claims priority, application United Kingdom, Dec. 21, 1984, 8432448; European Pat. Off., Nov. 15, 1985, 85308356.6
Int. Cl.[4] B26D 1/20
U.S. Cl. 83—455 2 Claims

1. An apparatus for cutting sheet material comprising:
an elongated beam;
a pair of head structures mounted on opposite ends of the beam, each of said head structures including clamping means for removably securing the head structure to a device, such as a table, which provides a flat work surface for supporting the material to be cut;
an elongated guide member extending from one head structure to the other head structure;
a carriage mounted on the guide member and displaceable therealong; and
a cutting blade mounted on the carriage;
each of said clamping means comprising a fixed jaw and a jaw movable towards and away from the fixed jaw; the movable jaw having a nut threaded on a screw and a knob mounted on the screw to rotate the screw, the knob being displaceable relative to the screw in the direction of the length of the screw so that the knob is movable between



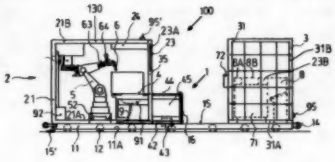
positions in which it is in ambush in a cavity defined by the head structure and in which it is outside the head structure, respectively.

4,686,877

LIQUID JET CUTTING MACHINE FOR CUTTING WORKPIECES, ESPECIALLY FLAT WORKPIECES

Erich Jaritz, Kapfenberg, and Günter Krammer, Vienna, both of Austria, assignors to Vereinigte Edelstahlwerke Aktiengesellschaft (VEW), Vienna, Austria

Filed Apr. 7, 1986, Ser. No. 848,922
Claims priority, application Austria, Apr. 16, 1985, 1149/85
Int. Cl.[4] B26F 3/00
U.S. Cl. 83—177 37 Claims



1. A high-pressure liquid jet cutting machine for cutting workpieces, especially flat workpieces, comprising:
at least one high-pressure liquid producing means for producing a high-pressure cutting liquid;
at least one cutting head operatively connected with said high-pressure liquid producing means and delivering a high-pressure liquid cutting jet;
guide means for guiding a controlled movement of said cutting head during a cutting operation;
holding means for holding said workpiece at least during said cutting operation;
cutting jet collecting means for collecting spent cutting liquid;
connecting elements for providing power supply connections and liquid supply as well as spent liquid drain connections at the high-pressure liquid jet cutting machine;
a mobile transport unit;
said at least one high-pressure liquid producing means, said at least one cutting head, said guide means, said holding means, said cutting jet collecting means, and said collecting elements being at least indirectly connected with said mobile transport unit;
blocking means for blocking said mobile transport unit at a preselected location;

said at least one cutting head, said guide means and said holding means each define an associated working area;

said mobile transport unit containing a predetermined number of cells;

one of said predetermined numbers of cells surrounding substantially on all sides said at least one cutting head and the associated working area thereof, said guide means and the associated working area thereof, said holding means and the associated working area thereof, and said cutting jet collecting means;

said one cell containing ultrasound damping means surrounding substantially on all sides and in an ultrasound damping manner said at least one cutting head and the associated working area thereof, said guide means and the associated working area thereof, said holding means and the associated working area thereof, and said cutting jet collecting means;

said predetermined number of cells on said mobile transport unit contains one further cell;

said one further cell surrounding said high-pressure liquid producing means;

said one further cell containing ultrasound damping means surrounding substantially on all sides and in an ultrasound damping manner said high-pressure liquid producing means;

a walkable passageway;

said walkable passageway spatially separating said one cell and said further cell of said predetermined number of cells on said mobile transport unit;

said holding means containing at least workpiece infeed means facing said walkable passageway.

4,686,878

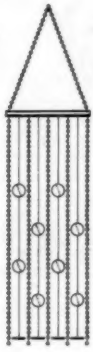
NEW ORLEANS WIND CHIMES

Barbara A. Hebert, 812 Cameron Ct., Kenner, La. 70065

Filed Aug. 4, 1986, Ser. No. 873,212

Int. Cl.[4] G10D *13/08*

U.S. Cl. 84—404 **2 Claims**



1. A support for gripping and holding ornamental items, mobiles and chimes without the need for glues or any other locking devices such as tape, nuts or the like comprising: A plastic tubular cylinder having a full length slit. Cut along a first portion thereof, and having two slits, cut at either end along a second portion thereof opposite the first portion, whereby ornamental items, mobiles and chimes may be hung from the slit of the first portion and an upper support may be attached to the two slits on the second portion .

4,686,879

KEY TOUCH ADJUSTER FOR A KEYBOARD MUSICAL INSTRUMENT

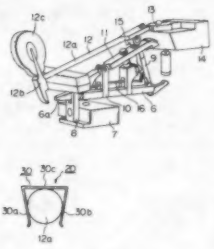
Makoto Ito; Terumi Mori, and Hiroyoshi Takahashi, all of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Jan. 30, 1986, Ser. No. 824,190

Claims priority, application Japan, Jul. 30, 1985, 60-115842[U]; Jul. 30, 1985, 60-115843[U]

Int. Cl.[4] G10C *3/12*

U.S. Cl. 84—440 **18 Claims**



1. A key touch adjuster for a keyboard musical instrument including a hammer having a maximum transverse dimension and being part of an action assembly for said keyboard musical instrument, comprising balance means comprising an elongated leaf spring movably coupled to said hammer, said leaf spring including a pair of opposed leg sections biased towards each other, whereby said pair of opposed leg sections are a predetermined distance apart when at rest and are biased towards each other when urged apart out of said rest position, said predetermined distance being less than said maximum transverse dimension of said hammer, whereby said balance means is firmly attached to said hammer when applied to a predetermined location therein.

4,686,880

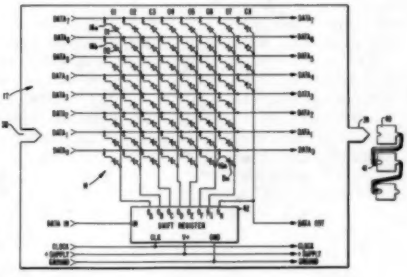
DIGITAL INTERFACE FOR ACOUSTIC AND ELECTRICALLY AMPLIFIED PIANOS

Steven J. Salani, Milpitas, and Jeffrey C. Moffatt, Cupertino, both of Calif., assignors to Forte Music, Inc., San Jose, Calif.

Filed Apr. 18, 1984, Ser. No. 601,474

Int. Cl.[4] G10H *1/34;* **G06F** *3/02*

U.S. Cl. 84—1.01 **1 Claim**



1. In a musical instrument having a keyboard, a digital keyboard interface for use in enabling said musical instrument to communicate with an electronic music synthesizer, data storage device or the like, said interface comprising:

a plurality of modular switch assemblies securely positioned directly beneath said keyboard, each said switch assembly

consisting of a plurality of switches associatated with a consecutive group of keys of said keyboard such that key actuation produces a corresponding switch actuation, said modular switch assemblies being physically and electrically identical to one another and being assigned to sequential sets of keyboard keys, with said switch assemblies being positioned end-to-end and interconnected for transparent cascaded operation along a predetermined number of common data and control lines; and

matrix means for assigning switch actuation information to a corresponding bit position of a data byte in a digital data stream, said matrix means defining a plurality of columns and rows, each row corresponding to a bit position of said data byte, and said matrix means further comprising:

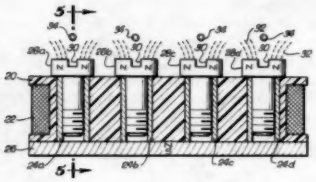
a shift register operable to sequentially actiate said plurality of columns, wherein each key actuated switch is operatively associated with the intersection of a matrix row and column, assigning an initial logic value to said corresponding bit position upon switch actuation when said shift register activates an associated column, and assigning an opposing logic value to said corresponding bit position in the absence of switch actuation when said shift register activates the associated column.

4,686,881

ELECTROMAGNETIC PICKUP FOR STRINGED MUSICAL INSTRUMENTS

C. Leo Fender, 1510 Dana Pl., Fullerton, Calif. 92635

Filed Sep. 30, 1985, Ser. No. 782,114
Int. Cl.[4] G10H *3/18*
U.S. Cl. 84—1.15 **4 Claims**



1. An electrical musical instrument of the stringed type, comprising:

a body;

a neck extending from the body;

a plurality of strings extending across the body and along the neck;

an electromagnetic pickup assembly secured to the body and including (a) a plurality of pole pieces each having a first end adjacent the plane of the strings and lying directly below a string, each first end having a slot therein thereby to define a pair of pole faces, (b) coil means associated with the pole pieces and (c) a housing for supporting each pole piece for rotation about its longitudinal axis, wherein the pole pieces are rotatable to a first configuration in which each slot is parallel to its respective string to provide a first sound characteristic and a second configuration in which each slot is perpendicular to its respective string to provide a second sound characteristic.

4,686,882

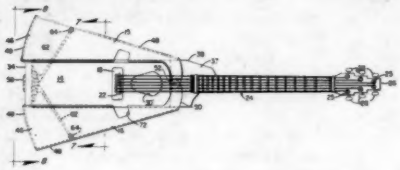
EXPANDIBLE AND COLLAPSIBLE ACOUSTIC GUITAR

Eric D. Shaw, 29300 Routt County Rd. #14, Steamboat Springs, Colo. 80487

Filed Feb. 20, 1986, Ser. No. 831,334
Int. Cl.[4] G10D *1/08*
U.S. Cl. 84—291 **17 Claims**

1. In a stringed musical instrument having a sound board, an elongated fingerboard extending from one end of said sound board and means for pivotally connecting said fingerboard to said sound board, the combination therewith comprising:

a body section containing said sound board, said body section having a center section including a top panel, a bottom panel and end walls joining said top and bottom panels together, and side wing sections forming movable



closures on opposite sides of said central section, each said side wing section correspondingly including top and bottom panels and a sidewall joining said wing panels together, said center section and side wings together defining a hollow enclosure, and

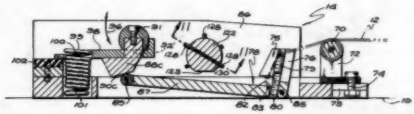
means for connecting said side wings in articulated relation to said center section.

4,686,883

GUITAR WITH IMPROVED VIBRATO AND TUNING ADJUSTMENT ASSEMBLIES

Roland J. Piche, 6755 Yucca St., Apt. 21, Hollywood, Calif. 90028, and John W. Carruthers, 3307 Colbert Ave., Los Angeles, Calif. 90066

Filed Jun. 11, 1986, Ser. No. 872,887
Int. Cl.[4] G10D *3/12*
U.S. Cl. 84—313 **22 Claims**



1. A guitar, comprising:

a guitar body;

an elongated neck projecting from said body and supporting a head generally at the distal end of said neck;

a tuning machine on said head;

a bridge unit on said body; and

a plurality of strings supported under tension between said tuning machine and said bridge unit;

each of said tuning machine and said bridge unit including means for individually and independently supporting said guitar strings, said tuning machine further including means for individually and independently adjustably selecting the tension force applied to each of said strings;

said bridged unit including a plurality of generally L-shaped rocker arms each having a forward generally upstanding leg and a lower leg extending generally rearwardly from said forward leg in a direction away from said neck, means for supporting said rocker arms for pivoting movement about a pivot axis extending generally transversely through the junctures of said forward and lower legs, said strings being respectively seated upon the upper ends of said forward legs whereby pivoting movement of said rocker arms displaces said forward leg upper ends generally longitudinally relative to said neck to alter the tension forces applied to said strings, and pivot means on said bridge unit for controllably pivotably moving said rocker arms;

said pivot means comprising a plurality of separate cams respectively engaging the rear ends of said lower rocker

arm legs, and means for displacing said cams relative to said rocker arms; and

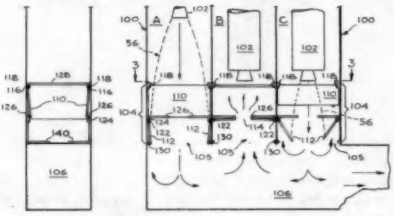
said cam displacing means comprising a control shaft rotatably supported by said bridge unit and carrying said cams, a control lever at one end of said control shaft for manually rotating said control shaft to displace said cams relative to said rocker arms, and spring means for returning said control lever and control shaft to an initial primary tuning set position when said control lever is released.

4,686,884

GAS MANAGEMENT DEFLECTOR

Edward T. Piesik, Pomona, Calif., assignor to General Dynamics, Pomona Division, Pomona, Calif.

Filed Dec. 27, 1985, Ser. No. 813,906
Int. Cl.[4] F41F *3/04*
U.S. Cl. 89—1.816 **19 Claims**



1. Apparatus for controlling the flow of exhaust gases of missiles in a plurality of missile storage chambers during firing of a missile comprising:

a plurality of missile storage chambers oriented generally adjacent one another;

a plenum chamber extending generally along the bottom of said storage chambers and coupled thereto for disposing of exhaust gases generated in said chambers by the firing of a missile therein; and

a plurality of transition sections, one for each chamber, extending between respective chambers and the plenum chamber, each transition section including:

(a) a pair of doors pivotably mounted on a first pair of opposite sides of the transition section adjacent the juncture of the transition section with its associated chamber, said doors being pivotable between open and closed positions in response to gas pressure forces generated during the firing of a missile, said doors when in the closed position serving to close off the transverse bottom opening of the chamber; and

(b) a pair of deflector panels pivotably mounted on the other pair of opposed sides of the transition section in a position below the doors, said deflector panels being effective in cooperation with said doors to direct the exhaust gases of a missile being fired to form a gas plug effectively preventing the recirculation of gases back into said chamber as the missile moves upward in said chamber during launch.

4,686,885

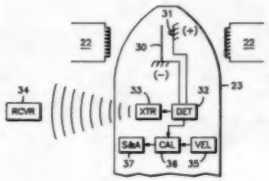
APPARATUS AND METHOD OF SAFE AND ARMING MUNITIONS

Monty W. Bai, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 17, 1986, Ser. No. 853,247
Int. Cl.[4] F42C *17/00*
U.S. Cl. 89—6.5 **5 Claims**

1. A method of safe and arming a munition comprising the steps of:

transmitting arming data to said munition using a magnetic field by setting a control unit to provide said arming data and generating a magnetic field about a portion of said munition containing a setting receiver, said setting receiver being a magnetically responsive, microminiature switch comprising a silicon wafer having a reduced thickness, deflectable beam adapted to move from a relaxed condition toward increasing bending conditions upon the application of an increasingly greater magnetic field, a stationary contact member disposed adjacent and spaced from said beam, with the latter in its relaxed condition, the beam and contact member defining a pair of



confronting surfaces, a pair of switch terminals and electrical contact means associated with said confronting surfaces for connecting said pair of switch terminals conductive when the beam is moved from its relaxed condition to a preselected bending position.

firing said munition;

calcualting an arming time of said munition; and

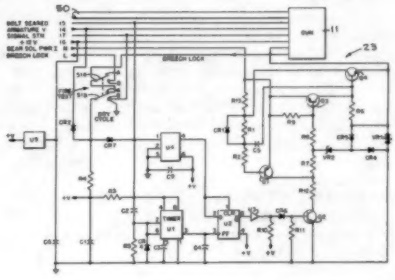
arming said munition after the expiration of said arming time.

4,686,886

DEVICE FOR TEST FIRING OF GUNS WITHOUT AMMUNITION

David D. Caserza, San Jose, and John W. Russell, Santa Clara, both of Calif., assignors to FMC Corporation, Chicago, Ill.

Filed Mar. 6, 1985, Ser. No. 708,834
Int. Cl.[4] F41D *11/00*
U.S. Cl. 89—11 **7 Claims**



1. A device for controlling the test firing of guns in automatic and semi-automatic modes without using live ammunition, for use with a gun having a mechanical stop for terminating operation when a misfire occurs during a cycle of operation and for use with a source of signals for controlling operation of said gun, said device comprising:

a timing circuit coupled to said signal source for using a gun control signal from said signal source to develop an electrical override signal at a time when gun recoil should occur relative to a firing signal;

means for coupling said timing circuit to said mechanical stop on said gun; and

means for using said electrical override signal to actuate said mechanical stop and allow said cycle of operation to continue as though gun recoil had taken place.

4,686,887

APPARATUS FOR SUPPLYING CARTRIDGE BELTS FROM A MAGAZINE TO A MACHINE GUN

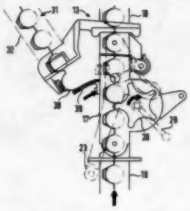
August Schiele, Augsburg, Fed. Rep. of Germany, assignor to Kuka Wehtechnik GmbH, Augsburg, Fed. Rep. of Germany

Filed Mar. 14, 1986, Ser. No. 839,540

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1985, 3510308

Int. Cl.[4] F41D *10/14*

U.S. Cl. 89—33.16 19 Claims



1. An apparatus with a guide channel for supplying cartridges arranged on a belt from a magazine to a machine gun by means of a drive acting on the belt or on the cartridges, each belt member comprising a double claw guided with guide noses in the guide channel which axially and radially fixes the cartridge, as well as a single claw engaging in fixed manner between the double claw of the adjacent belt member in a flush, rotary manner, but fixed in the axial and belt direction, adjacent belt members being separable by an approximately radial movement, wherein for filling

(a) the guide channel between the magazine and the mechanical belt drive has a separating point and beneath it a channel portion in the form of a switch point pivotable about a transverse spindle from the loading position and which can be aligned with a replacement ammunition channel,

(b) in the vicinity of the channel portion is provided a hand drive acting on the belt or on the cartridges for supplying a replacement ammunition belt in the replacement ammunition channel through the swung out channel portion into the guide channel part leading to the magazine,

(c) a pivoting device acting on the channel portion is provided which, after filling the magazine, separates the replacement ammunition belt at the separating point between the channel portion and the replacement ammunition channel and after pivoting back aligns the belt member located below the separating point in the channel portion with the guide channel part leading to the weapon, whereupon

(d) the belt is conveyed by means of the hand drive into the guide channel part leading to the weapon to such an extent that it is engaged by the drive leading to the weapon or by the actual weapon.

4,686,888

TURRET SYSTEM FOR LIGHTWEIGHT MILITARY VEHICLE

Steven L. Sanborn, Warren, and Martin J. Neumeyer, Utica, both of Mich., assignors to AM General Corporation, Detroit, Mich.

Division of Ser. No. 736,218, May 20, 1985, Pat. No. 4,574,685, which is a continuation of Ser. No. 506,802, Jun. 22, 1983, abandoned. This application Mar. 3, 1986, Ser. No. 835,464

The portion of the term of this patent subsequent to Mar. 11, 2003, has been disclaimed.

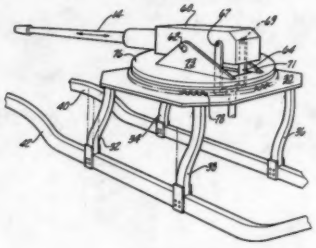
Int. Cl.[4] F41F *21/08*

U.S. Cl. 89—37.13 15 Claims

1. A military land vehicle having a roof and an interior volume having at least one passenger seat, the vehicle permitting interchangeability of different weapon stations, each weapon station including a weapon mounted on a disk, the vehicle comprising:

a platform located interiorly of an opening in the roof of the vehicle, the platform having a generally flat upper surface and an aperture therethrough, lower portions of the platform being connected to a frame for the vehicle by way of a plurality of flexible stanchions spaced about the periphery of the platform;

azimuth drive means on the upper surface of the platform for rotating the disk about 360 degrees, said azimuth drive



means having at least one electric motor driving a gear assembly mounted to the upper platform surface;

means for removably attaching the disk of the desired weapon station to the gear assembly of the azimuth drive means;

elevation drive means including a ball and socket joint located in the interior of the vehicle and extending through the aperture in the platform; and

connection means for removably connecting the elevation drive means to the weapon.

4,686,889

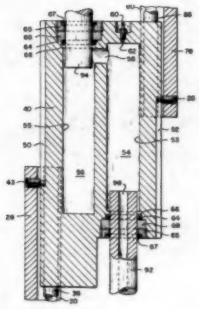
VARIABLE HEIGHT COLUMN WITH INTEGRAL ACTUATING MEANS

George D. Hall, Erie, Pa., assignor to American Sterilizer Company, Erie, Pa.

Filed Dec. 21, 1984, Ser. No. 684,604

Int. Cl.[4] F01B *15/02, 1/00*

U.S. Cl. 92—117 A 11 Claims



1. A variable height column for supporting a load support surface comprising:

a base having a plurality of upwardly extending base guide members;

a midsection having a plurality of guide paths, said midsection being adapted for vertical movement relative to said base;

an upper section having a plurality of downwardly extending upper guide members, said upper section being

adapted for vertical movement relative to said midsection; said base guide members and said upper guide members being dimensioned to travel along said guide paths; and

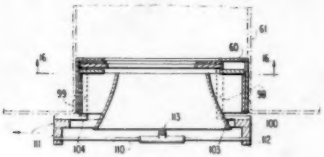
hydraulic means for actuating the vertical movement of said mid and upper sections, said actuating means so operatively connecting said base and said midsection that said actuating means pushes said midsection upwards along said base guide members for extension relative to said base and is received within said midsection for retraction of said midsection relative to said base, and said actuating means so operatively connecting said upper section and said midsection that said actuating means pushes said upper section upwards along said upper guide members for extension relative to said midsection and is received within said midsection for retraction of said upper section relative to said midsection, said actuating means being adapted to move said upper section relative to said midsection at the same rate as it moves said midsection relative to said base to provide uniform extension and retraction of said column.

4,686,890

AIR DISTRIBUTION SYSTEM

Ronald D. Stouffer, Silver Spring, and Paul L. Sulsky, Columbia, both of Md., assignors to Bowles Fluidics Corporation, Columbia, Md.

Filed Sep. 14, 1984, Ser. No. 650,468
Int. Cl.[4] B60H *1/34*; F24F *13/08*
U.S. Cl. 98—2 **14 Claims**



1. An air distribution controller comprising means forming an opening from a source of air under pressure for issuing air to ambient atmosphere with a main air flow vector,

a short wall connected to said opening and diverging from said opening and extending in a direction away from said opening,

means adjacent said short wall defining a parallel flow path for a relatively smaller volume of air from said source of air under pressure to an exit point downstream of and adjacent the end of and substantially parallel to said short wall,

means controlling the flow of said relatively small volume of air in said parallel flow path and the main air flow vector of air through said opening whereby said main air flow vector is substantially coaxial with said opening when said parallel flow path is closed and is deflected in the direction of said short wall when said parallel flow path is open.

4,686,891

VENTILATING DUCT SYSTEM

Fernand Pouchard, 42-09 Broadway, Astoria, N.Y. 11103

Filed Jul. 25, 1985, Ser. No. 758,964
Int. Cl.[4] F24F *9/00*
U.S. Cl. 98—36 **8 Claims**

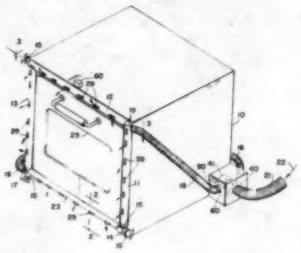
1. A ventilating system for disposition proximate the oven door of an oven which can be heated for conducting cool air, from a source of cool air thereto; comprising:

(a) first duct means secured proximate the oven door;

(b) openings formed through said first duct means at spaced locations along the length thereof;

(c) second duct means connected to said first duct means and to distribution box means;

(d) third duct means connected to said distribution box means and to the source of cool air such that cool air from the source of cool air is directed to said distribution box means and thereafter from said distribution box means to



said second duct means and thence to said first duct means from which the cool air flows out through said openings to cool the area proximate the oven door; and

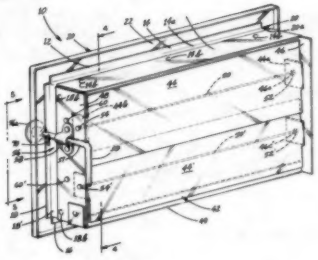
(e) thermostat means disposed for coaction with the oven door and operative in response to opening of the oven door to shut off the flow of cool air from said distribution box means.

4,686,892

AUTOMATIC ENERGY SAVING VENT SYSTEM FOR AIR CONDITIONING SYSTEMS AND HEATING SYSTEMS

Bennie G. Foster, 1336 McDonnel Ave., Canton, Miss. 39046

Filed Oct. 9, 1986, Ser. No. 917,388
Int. Cl.[4] F24F *13/14*
U.S. Cl. 98—107 **13 Claims**



1. An air conditioning energy saving vent system comprising:

a vent member including a plurality of openings for conditioned air to enter a room or rooms to heat or cool the same;

a vent mounting frame extending into the vent member and away from the room and integrally connected to the vent member;

means for attaching to said mounting frame a flap assembly including a flap movable between a first closed position blocking the flow of conditioned air into the room or rooms and a second position allowing conditioned air to enter the rooms;

manual means for moving said flap manually between the open and closed positions whereby a room or rooms which are not to be heated or cooled may be blocked off from the air conditioning or heating system by the manual closing of the flap;

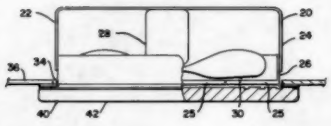
said manual means comprising a generally L shaped member which is rotatably mounted upon said frame, said L-shaped member having a distal end portion which is rotatable into a position blocking movement of said flap to open position.

4,686,893

COVER ASSEMBLY FOR AN AIR MOVING DEVICE

Danny R. Jinkins, 337 Center St., Bryan, Ohio 43506

Filed Jun. 23, 1986, Ser. No. 877,388
Int. Cl.[4] F23L *7/00*
U.S. Cl. 98—119 **5 Claims**



1. A cover assembly of variable size for an air moving device mounted in the opening of a rigid structural support through which air will be drawn when the device is operated, a grill connected to the device and having a rim thereof of magnetizable material extending over the support, the cover assembly comprising:

(a) a cover made of insulating material and sized to extend beyond the opening of the device by a predetermined amount,

(b) the cover having an internal side facing toward the rim of the grill, an external side facing away from the rim of the grill, and a periphery extending about the perimeter between the internal and external sides thereof,

(c) the internal side of the cover having a purality of recesses spaced circumferentially inwardly from the periphery of the cover, each in the form of a continuous channel forming a closed loop whereby one of the channels will substantially conform to the size of the rim of the grill,

(d) the outermost channel defining the largest cross-sectional area and the innermost channel defining the smallest cross-sectional area, with internal channels there between of intermediate cross-section,

(e) a magnetic material in the form of a magnetic strip affixed within the said one of the channels conforming to the size of the rim of the grill whereby the cover assembly is adapted to be magnetically and detachably connected to the rim of the grill and thereby close the opening through the device, and

(f) the said one of the channels to which the magnetic strip is affixed to define the perimeter of the cover assembly and any insulating material extending beyond the said one of the channels will be removed.

4,686,894

CONTINUOUS COOKING GRILL

Marshall Long, 11147 Old Harbour Rd., North Palm Beach, Fla. 33408

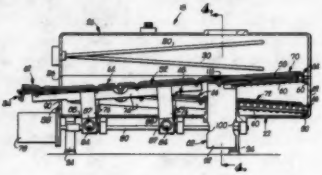
Filed Nov. 29, 1985, Ser. No. 802,705
Int. Cl.[4] A47J *37/04*
U.S. Cl. 99—386 **15 Claims**

1. A cooker comprising:

a U-shaped, primary grid, presenting a pair of elongated, spaced legs and a bight having a pair of separate, arcuate sections;

conveyors for advancing food items successively along one of said legs, one of said sections, the other of said sections and the other of said legs,

said one section being higher then said other section whereby the items invert as they fall from the one section to the other section and thereafter travel upside down; and



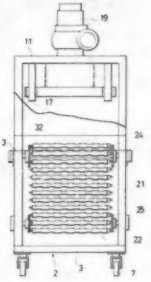
means subjecting one side of the items to heat prior to inversion and the opposite side thereof to heat after inversion.

4,686,895

APPARATUS FOR PRODUCING BOILED EGGS

Yuuji Ishino; Hitoshi Takai, and Toshihiro Yoshida, all of Matsuto, Japan, assignors to Ishino Seisakujo Co., Ltd., Kanazawa, Japan

Filed Dec. 9, 1985, Ser. No. 806,704
Claims priority, application Japan, Dec. 11, 1984, 59-261037
Int. Cl.[4] A47J *29/00*
U.S. Cl. 99—440 **6 Claims**



1. An apparatus for producing boiled eggs, comprising:

a housing;

endless chains guided around a driving sprocket and a guiding sprocket, having at least portions of upper running paths and lower running paths thereof positioned in said housing to form a circulating path between said upper and lower running paths thereof and arranged in two rows in parallel to each other;

a multiplicity of tubular members each formed at opposite ends thereof with bearing portions and having said opposing bearing portions rotatably supporting pin extensions of said endless chains opposed thereto and provided between said endless chains in two rows to form a chain conveyor;

rail members being in contact with the undersurfaces of end portions of respective tubular members positioned in the upper running paths to support said tubular members;

a radiator of infrared rays provided upwardly of the rows of said tubular members positioned in said upper running paths in said housing; and

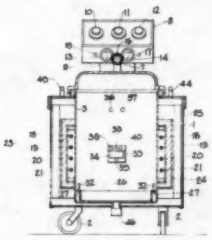
an exhaust gas blower provided in said housing; wherein grooves being circularly arcuate in cross section and each having a width slightly larger than an egg at the largest are formed on the outer peripheral surfaces of said tubular members in the circumferential direction of said tubular members and egg holding surfaces are formed by the opposing circularly arcuate grooves of said tubular members disposed adjacent to each other.

4,686,896

PRESSURE SMOKER

Jerry D. Gordon, Tulsa, Okla., assignor to Henny Penny Corporation, Eaton, Ohio

Filed May 15, 1986, Ser. No. 863,576
Int. Cl.[4] A23B *4/04*
U.S. Cl. 99—482 **12 Claims**



1. A pressure smoker comprising a housing, a stainless steel cooking vessel mounted in said housing, said cooking vessel having enclosing front, rear and side walls, a bottom, and an open top having a peripheral edge, a lid adapted to close the open top of the cooking vessel, means for releasably sealing said lid against the perpheral edge of said vessel, a plurality of electric heating elements extending horizontally along the front and side walls of said cooking vessel intermediate the top and bottom ends thereof; the bottom of the cooking vessel and the contiguous lowermost portions of the cooking vessel being free from heating elements, an enclosed smoke cavity projecting outwardly from the rear wall of said cooking vessel centrally thereof, a separate heating element in said smoke cavity, a removable chip tray in said cavity overlying said separate heating element, first control means for energizing and deenergizing said first named heating elements, second control means for energizing said separate heating element, a drip pan adapted to be seated on the bottom wall of said cooking vessel, removable rack means adapted to be inserted in said cooking vessel and seat on said drip pan, and pressure relief means for relieving pressure in said cooking vessel.

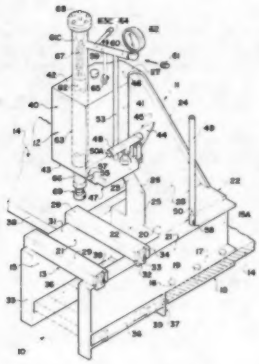
4,686,897

HYDRAULIC BENCH PRESS

Paul C. Frank, Box 23, Halkirk, Alberta, Canada (T0C 1M0)

Filed Apr. 30, 1986, Ser. No. 857,483
Claims priority, application Canada, May 9, 1985, 481122
Int. Cl.[4] B30B *1/32*
U.S. Cl. 100—214 **20 Claims**

1. A hydraulic bench press for attachment to a supporting surface such as a bench; comprising in combination supporting structure, said supporting structure including a main frame consisting of a pair of spaced and parallel press bar supports having rear ends, an underside and an upper side, a press frame having an upper end which includes a front secured to adjacent said rear ends of said press bar supports and extending upwardly therefrom, a manually operated hydraulic press assembly supported upon said upper end of said press frame and a pair of press bars operatively situated across said press bar supports below said press assembly ,said hydraulic press assembly including upper and lower plates and a hydraulic fluid tank therebetween, a pump block on said lower plate, a manually operated hydraulic pump on said pump block operatively connected to said tank and to said pump, a manual release valve in said pump block, a vertically situated press head assembly having an upper end and a lower end mounted through said tank and including a piston head on the lower end thereof extending below said lower plate in operative relationship with said press bars, and a pressure relief valve assembly operatively connected to said pump and to said oil tank.

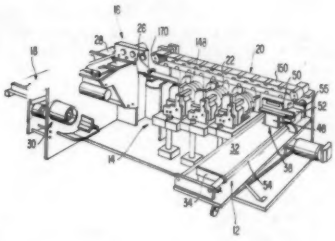


4,686,898

CREDIT CARD EMBOSSING SYSTEM

Richard J. LaManna, Whippany; James L. Hinton, Short Hills, both of N.J., and Edward L. Cucksey, Upper Nyack, N.Y., assignors to National Business Systems, Inc., Ontario, Canada

Filed Jan. 21, 1986, Ser. No. 820,705
Int. Cl.[4] B13F *1/07*; B41J *11/50*
U.S. Cl. 101—18 **49 Claims**
MICROFICHE APPENDIX INCLUDED
(2 Microfiche, 163 Pages)



1. An embossing system for embossing blank cards with a plurality of vertically separated horizontally disposed lines on which characters are to be embossed with at least one line being embossed with characters of a first pitch and at least one line being embossed with characters of a second pitch comprising:

(a) card supply means for feeding blank cards to be embossed;

(b) card transporting means for receiving blank cards to be embossed from the card supply means and for transporting the cards received from the card supply means along a transport path to a plurality of separate embossing positions and to a position where embossing is completed;

(c) a plurality of card embossing means each disposed at a separate one of the embossing positions disposed along the transport path, each card embossing means being vertically positioned with respect to the transport path to emboss a different one of the horizontally disposed lines of characters on each card, at least one of the card embossing means embossing a character set of a first pitch on one of

the horizontally disposed lines and at least another of the card embossing means embossing a character set of a second pitch on another of the horizontally disposed lines; and

(d) control means coupled to the card supply means, the card transporting means and the plurality of card embossing means for controlling the card supply means to feed blank cards to the card transporting means, the transporting of the cards received by the card transporting means to the separate embossing positions along the transporting path and the position where embossing is completed and the plurality of card embossing means to emboss the plurality of lines on each blank card.

4,686,899

SHUTTLE MOUNTING IN MATRIX LINE PRINTER

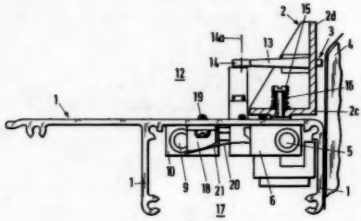
Karl Puchegger, Foehrenau, Austria, assignor to Mannesmann Tally GmbH, Vienna, Austria

Filed Sep. 29, 1986, Ser. No. 913,080

Claims priority, application European Pat. Off., Sep. 28, 1985, 85112334.9

Int. Cl.[4] B41J *3/04*

U.S. Cl. 101—93.04 **5 Claims**



1. In a matrix line printer which includes a frame, a shuttle-carrier mounted in the frame for limited reciprocating movement and provided for supporting a plurality of print elements, a plurality of rollers journalled in the frame and arranged along a line parallel to the direction of reciprocating movement of the shuttle; the improvement comprising:

said shuttle having vertically arranged first and second separate shuttle parts secured together, a plurality of projecting arms on the second shuttle part each of said arms engaging one of said rollers and being guided thereby,

a pair of guide pins arranged in coaxial relation to each other and being mounted to respective opposite ends of said first shuttle part, said pins having a circular cross section and a cylindrical overall configuration;

a pair of corresponing sleeve-like bearings mounted to the frame and receiving respectively said pins;

first spring means on the shuttle for urging said projections against said rollers; and

compression springs arranged to exert a force transversely to the coaxial alignment of said pins, said compression springs being in mounted to resiliently hold said first and second shuttle parts in contact with each other.

4,686,900

IMPACT PRINTER WITH APPLICATION OF OBLIQUE PRINT FORCE

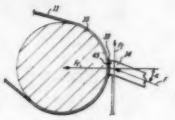
Richard G. Crystal, Los Altos, and Andrew Gabor, Alamo, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 5, 1985, Ser. No. 804,955

Int. Cl.[4] B41J *9/00, 1/30*

U.S. Cl. 101—93.48 **8 Claims**

1. A serial impact printer including means for delivering a printing force to drive a character element in sequence against marking means, mark receiving means and a print line on a platen in order to deform said platen during a contact period, characterized in that said means for delivering comprises shear inducing impacting means and means for moving said impacting means against said character element along a line forming an angle of at least 15° and no greater than 40° to a line normal



to the surface of said platen at the point of contact of said impacting means with said platen, so that a shear force is induced between said character element and said marking means during said contact period, and said impacting means causes said contact period to last for at least 1 millisecond.

4,686,901

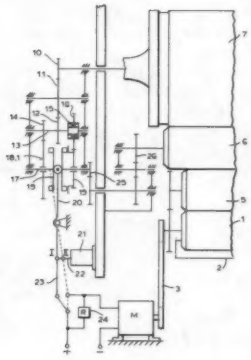
METHOD AND DEVICE FOR REMOVING SPOTS FROM A PRINTING PLATE

Jentzsch Arndt, Coswig; Guenter Schumann, and Wolfgang Stellmacher, both of Radebeul, all of German Democratic Rep., assignors to VEB Kombinat Polygraph "Werner Lamberz" Leipzig, Leipzig, Fed. Rep. of Germany

Filed Oct. 6, 1986, Ser. No. 915,802

Int. Cl.[4] B41L *25/16*

U.S. Cl. 101—148 **3 Claims**



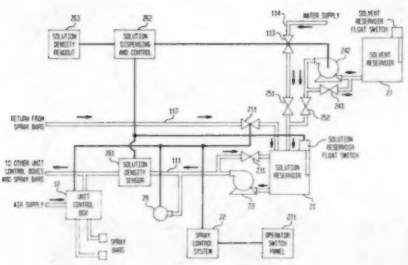
1. In a method of removing spots from a printing plate of a printing machine by means of an application roller of a moistening mechanism also having an immersion roller immersed in a container with a moistening agent supply for said application roller for application of the moistening agent to the printing plate, wherein the application roller can be driven by a plate cylinder connected thereto in a form-locking manner, an interposition switching coupling so that a peripheral speed of the application roller in a coupled position is lower than that of the plate cylinder, the method comprising periodically engaging said switching coupling with said application roller so that the peripheral speed thereof is lower than that of the plate cylinder, driving the immersion roller with a higher speed for a time period during which the application roller is in the coupled position.

4,686,902

AUTOMATIC BLANKET WASH SYSTEM

Raymond J. Allain, Westerly, R.I.; Henry P. Bolduc, Jr., Pawcatuck, Conn.; Thomas R. Patterson, Wyoming, and Timothy J. Ingram, Westerly, both of R.I., assignors to Precision Engineered Systems Inc., Pawcatuck, Conn.

Filed Oct. 31, 1986, Ser. No. 926,379
Int. Cl.[4] B41F *35/06*; B41L *41/06*
U.S. Cl. 101—424 1 Claim



1. An automatic blanket wash system, for spraying a mixture of a solvent and water onto blanket rollers of printing press units, the system comprising:

(a) a reservoir;

(b) delivery means for delivering quantities of water and solvent into the reservoir in predetermined proportions;

(c) a plurality of spray system units in a fluid path, each spray system unit including (i) upper and lower spray bars for spraying the mixture respectively onto upper and lower blanket rollers of a printing unit with which the spray system unit is associated and (ii) a unit control in the fluid path to each of the upper and lower spray bars, such unit control having a fluid input and unit valve means normally closed, for permitting the mixture to flow, upon electrical actuation, from the fluid input to and through the spray bars;

(d) a supply line in fluid communication with the reservoir and the fluid input of each of the unit controls, one of such fluid inputs being the last of the unit controls along such supply line;

(e) a return line in fluid communication between the fluid input of the last unit control and the reservoir;

(f) pumping means for causing circulation of the mixture from the reservoir through the supply line, past the fluid input of each of the unit controls, through the return line, and then back to the reservoir, so that the circulation of the mixture tends to prevent settling of the solvent and to ensure homogeneity of the mixture at the fluid input of each unit control;

(g) wash valve means, disposed in the return line and normally open, for, on electrical actuation, substantially restricting flow through the return line so as to increase fluid pressure in the supply line; and

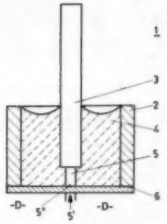
(h) wash control means, for actuating the wash valve means so as to increase pressure in the supply line, and thereafter to actuate the unit valve means of the unit controls as to cause the mixture to be sprayed by the spray bars.

4,686,903

METHOD OF MANUFACTURING A POLE BODY FOR AN ELECTRIC FUSE, POLE BODY FOR AN ELECTRIC FUSE AND METHOD OF USING THE POLE BODY

Alfred Wittwer, Niederglatt, Switzerland, assignor to Ems-Inventa AG, Zürich, Switzerland

Filed Apr. 22, 1985, Ser. No. 725,960
Claims priority, application Switzerland, May 21, 1984, 2495/84
Int. Cl.[4] F42B *3/12*
U.S. Cl. 102—202.5 18 Claims



1. A method of manufacturing a pole body for an electric fuze comprising at least two metallic poles which are separated from each other by means of a substantially homogeneous insulator and which are electrically conductively interconnected at their end faces by a metal layer arranged in the region of a detonator charge, one of said poles forming a detonating bridge at a contact location with said metal layer, said method comprising the steps of:

preforming one of said poles with a substantially needle-shaped detonator pin having a needlepoint shaped end;

inserting with play said preformed pole into a glass tube;

supporting said glass tube including said preformed pole at a base plate;

surrounding with play said glass tube including said preformed pole by a metal tube;

loading said preformed pole at an end remote from said base plate with a heat-resistant guiding body; and

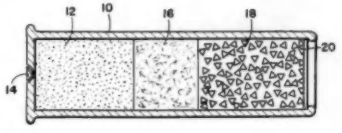
melting said glass tube and thereby fusing said preformed pole to the material of said glass tube and into said metal tube.

4,686,904

SHELL HAVING PYRAMID SHAPED SHOT

Gilbert A. Stafford, 2600 W. Newton, Tulsa, Okla. 74127

Filed Jun. 2, 1986, Ser. No. 869,317
Int. Cl.[4] F42B *7/04*
U.S. Cl. 102—439 3 Claims



1. A shell comprising:

a casing;

a propellant contained within said casing;

means to ignite said propellant; and

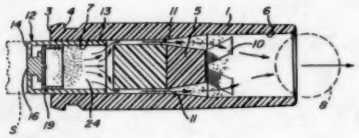
shot formed of a plurality of metallic pellets each in the form of a polyhedron having a polygonal base and triangular faces meeting in a common apex, the base and all faces being equally dimensioned and shaped.

4,686,905

CARTRIDGE FOR FRANGIBLE PROJECTILE

Attila Szabo, 33 Côte Ste-Catherine, Outremont, Province of Quebec, Canada

Filed Jul. 26, 1985, Ser. No. 759,461
Int. Cl.[4] F42B *5/30, 7/02, 11/18*
U.S. Cl. 102—444 **14 Claims**



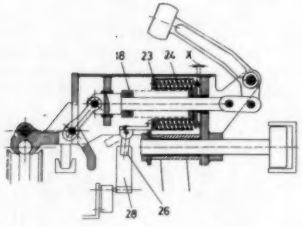
1. A fire-arm cartridge comprising an open-ended tubular casing having an intermediate partition defining in the casing a front and a rear compartment, a frangible projectile frictionally and sealingly retained in said front compartment, said partition having an aperture communicating said front and rear compartments, a piston assembly including a sleeve and slidable within said rear compartment for movement between a forward position in which said sleeve substantially seals the communication through said aperture, and a rearward position in which said sleeve uncovers the communication through said aperture, and a propellant charge located within said sleeve, which, upon detonation, produces propellant gases which first cause said piston assembly to move rearwardly and then to cause said sleeve to uncover said aperture and allow said propellant gases to enter said front compartment behind said projectile and propel the same.

4,686,906

CLAMPING DEVICE WITH TEST SPRING DEFORMATION MEASUREMENT

Bernd Meindl, Wolfurt, Austria, assignor to Konrad Doppelmayr & Sohn Maschinefabrik Gesellschaft m.b.H & Co. KG., Austria

PCT No. PCT/AT84/00031, § 371 Date May 14, 1985, § 102(e) Date May 14, 1985, PCT Pub. No. WO85/01257, PCT Pub. Date Mar. 28, 1985
PCT Filed Sep. 19, 1984, Ser. No. 740,070
Claims priority, application Austria, Sep. 20, 1983, 3354/83
Int. Cl.[4] B61B *12/06, 12/12*
U.S. Cl. 104—209 **11 Claims**



1. Clamping device for clamping conveying means to a movable cable, in particular for hanging units of monocable ropeways, said clamping device comprising

at least one pair of jaws embracing the rope, at least one of said jaws being forcible against the cable by at least one pressure spring and releasable therefrom by a pivotal lever running up on a stationary rail,

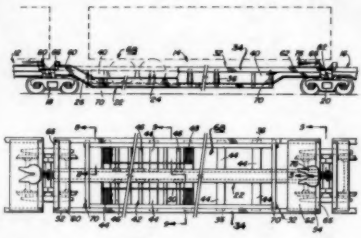
means for measuring the deformation of at least one test spring when the jaws are clamped to the cable and for indicating when a predetermined value of deformation is exceeded, at least one test spring being arranged in said clamping device and dimensioned to compress the pressure spring as soon as the spring power of the pressure spring falls below a predetermined value when the jaws are closed.

4,686,907

LOW LEVEL FREIGHT CAR

Ronald F. Woollam, New Glasgow, and Maurice L. MacDougall, Col. County, both of Canada, assignors to Hawker Siddeley Canada, Inc., Trenton, Canada

Filed Nov. 12, 1985, Ser. No. 796,709
Claims priority, application Canada, Jun. 26, 1985, 485270
Int. Cl.[4] B61D *3/14, 3/18*
U.S. Cl. 105—4.1 **17 Claims**



1. A low-level freight car comprising:

(a) a center sill extending the full length of the car and having a depressed low-level intermediate section and opposing raised end sections having a goose-neck configuration;

(b) a pair of side sill assemblies each of substantial depth and beam strength disposed in spaced flanking relation to said center sill;

(c) a low-level floor structure including a plurality of spaced lateral members connected between said low-level depressed center sill intermediate section and lower portions of each of said side sill assemblies for supporting at least a portion of the vertical loadings produced by a load being carried by the freight car in such a manner that these vertical loadings are transmitted via said lateral members to both said center sill intermediate section and to said side sill assemblies so that these vertical loadings are shared between them;

(d) end frame structures at opposing ends of the car interconnecting the center sill raised end sections to said side sill assemblies such that longitudinal buff and draft forces applied to said center sill end sections are in part transmitted to said side sill assemblies whereby such longitudinal forces are also shared between said center sill and the side sill assemblies;

(e) the side sill assemblies having upper extremities which are located at a level substantially above the level of said low-level center sill intermediate section to define together with said low level floor structure and said end frame structures an elongated well for receiving cargo.

4,686,908

PUBLIC TRANSPORT VEHICLE

Pierre Legrand, 98 Rue de Reunes, 75006 Paris, France

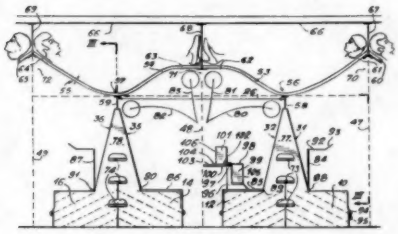
PCT No. PCT/FR84/00265, § 371 Date Jun. 18, 1985, § 102(e) Date Jun. 18, 1985, PCT Pub. No. WO85/02153, PCT Pub. Date May 23, 1985
PCT Filed Nov. 16, 1984, Ser. No. 747,129
Claims priority, application France, Nov. 17, 1983, 83 18271
Int. Cl.[4] B61D *1/02;* **B60N** *1/00*
U.S. Cl. 105—315 **8 Claims**

1. In a public transport vehicle, a compartment comprising:

at least one longitudinal main pasageway in said compartment;

at least one row of sitting seats on each side of said at least one main passageway, each said row of sitting seats comprising a longitudinally extending series of longitudinally spaced pairs of back-to-back seats, whereby any of said sitting seats is coupled back-to-back with another sitting seat of said pair of seats having an orientation opposite thereto, and faces a secondary passageway separating said any of said seats from another seat of another of said pairs of seats having an orientation opposite thereto;

at least one elevated lounger extending over each of said pairs of seats, each of said loungers being vertically undulated along the length thereof and positioned such that ends thereof are located over adjacent ones of said secondary passageways, wherein a longitudinal mid-portion of each of said loungers is lower than said ends thereof and is located over the seat backs of said pair of seats between said adjacent secondary passageways;



tie bolt means for securing each of said ends of said loungers to a roof of said compartment;

support means on said seat backs for supporting said mid-portions of said loungers; and

a vertical array of steps on lateral sides of each said pair of seats for permitting a passenger to raise himself into said loungers.

4,686,909

RAIL CAR BRIDGE PLATE SECUREMENT ASSEMBLY WITH ROTATING LEAF

Robert M. Burleson, Adamsville, Pa., assignor to Greenville Steel Car Company, Greenville, Pa.

Filed Oct. 3, 1985, Ser. No. 783,941

Int. Cl.[4] B61D *3/18;* **B60J** *5/10;* **E05B** *65/14*

U.S. Cl. 105—378 **15 Claims**

1. An assembly for securing a standard bridge plate to an upper deck of a railroad car arranged to carry automobiles on at least two levels, said railroad cars having a track member, from which a sliding door is hung, said track member mounted to the underside of a distal end of brackets attached to an edge of the deck at the end of the railroad car, the improvement comprising:

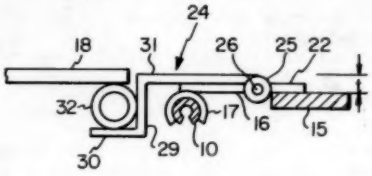
a fixed leaf secured to the surface of the deck extending therefrom to a distal end intermediate said track member and said deck edge and having spaced gudgeons mounted to said distal end of said fixed leaf;

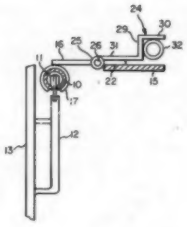
a rotating leaf having spaced gudgeons mounted thereto for being positioned between the spaced gudgeons secured to the fixed leaf;

pins for passing through the gudgeons and securing the leaves together such that the rotating leaf may be turned back onto the surface of the deck or may be rotated to bridge the track member from which the door is hung;

said rotating leaf having an offset thereon so that a portion of said rotating leaf extending away from the deck and beyond the track member is positioned downwardly of the top of said track member; and

spaced gudgeons mounted to a face of the portion of the rotating leaf positioned below and extending away from





the deck and arranged for receipt of a pin for securing the standard bridge plate.

4,686,910

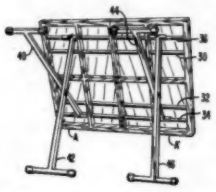
ADJUSTABLE MULTI-LEAF TABLE

Douglas N. Skjerseth, Petaluma, Calif., assignor to Seth Products, Inc., Santa Rosa, Calif.

Filed Apr. 1, 1986, Ser. No. 846,693

Int. Cl.[4] A47B *3/06*

U.S. Cl. 108—153 **4 Claims**



1. An adjustable table comprising in combination;

first and second table leaf members, each said table leaf member including:

a membrane having a flat working surface;

a plurality of transverse and a plurality of longitudinal gussets attached to the back side of said membrane to form reinforcement for said membrane whereby said membrane is stiffened into a table leaf member having an upwardly disposed working surface;

a plurality of pipes for supporting said table leaf members at said gussets and extending between said gussets to join said table leaf members into a unitary upwardly disposed table;

said plurality of transverse gussets defining respective aligned circular holes for snugly receiving and surrounding said pipes between said plurality of transverse gussets with said table leaf members registered one to another whereby said pipes are fastened to said table leaf members

and cause said table leaf members to be fastened and registered one to another;

locking means extending between said table leaf members for drawing said table leaf members over said pipes into snug side-by-side engagement at adjacent edges of said leaf members;

two pairs of legs members, each said pair of leg members including;

first and second leg members with each leg member having an elongate longitudinal member having an upper end and a lower end;

a member for fastening each said leg to said pipes including a normal affixed U-sectioned channel member at the upper end of each of said leg member;

a normally affixed shoe member affixed to the lower end of said leg member parallel to said U-sectioned channel member, said shoe member extending beyond said leg to transversely support said leg at least one side thereof;

said U-sectioned channel member dimensioned to received said table leaf member at one of said pipes;

means for clamping said pipes to said U-sectioned channel members and;

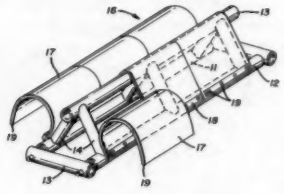
means for pivotally mounting said leg pairs together whereby said pairs of leg members pivotally and rigidly support said table in a cross-based disposition.

4,686,911

BLAST SUPPRESSION DEVICE

Thomas Phillips, Canfield, Ohio, assignor to DTS, Inc., Youngstown, Ohio

Filed Apr. 4, 1986, Ser. No. 848,246
Int. Cl.[4] E05G *3/00*; E04H *9/00*
U.S. Cl. 109—1 S **3 Claims**



1. A blast supression device for use in a confined area comprises a multiple segmented support frame, said frame having a plurality of inner-connected members secured in space relation to one another, on said multiple segments, said frame defining an elongated enclosure opened on its lower portion, a plurality of oppositely disposed flexible resilient flaps secured on one end to said support frame in side to side relation and overlapping each other on their respective free ends, end restraints removably positioned in oppositely disposed relation to one another on the open ends of said support frame.

4,686,912

ELECTRICALLY CONTROLLED LOCKING APPARATUS AND SAFE UTILIZING SAME

H. Frank Fogleman, and Randall E. Parrish, both of San Diego, Calif., assignors to The Protech Partnership, San Diego, Calif.

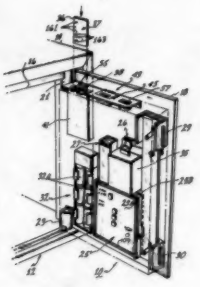
Filed Apr. 15, 1985, Ser. No. 723,547
Int. Cl.[4] E05G *1/04*; E05B *49/00*
U.S. Cl. 109—59 T **21 Claims**

1. An electrically controlled locking apparatus for door means, comprising:

means including a control linkage for locking said door means;

mechanical combination lock means operatively connected to said control linkage and having actuator means therefor mounted to be accessable from the non-protected side of said door means, for actuating said control linkage to cause the releasing of said door means;

electrically decoded lock control circuit means having input means and output means, said input means mounted to be accessible from the non-protected side of said door means for receiving electrical code signals indicative of an access code entered by a user attempting to release said door means, said circuit means generating an output electrical



signal when said code signals indicate the receipt of the correct access code; and

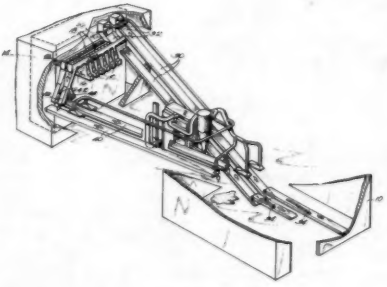
means responsive to said output signal for actuating said control linkage to cause the releasing of said door means, whereby said means for locking said door means causes the releasing of said door means in response to either said mechanical combination lock means or said electrical circuit means.

4,686,913

REFUSE DERIVED FUEL DELIVERY SYSTEM AND DISTRIBUTION CONVEYORS

Donald J. Kaminski, 122 E. White Oak Way, Mequon, Wis. 53092; Ernest A. Frank, N75 W34140 Brice Rd., Oconomowoc, Wis. 53066, and Craig S. Grinsteiner, 2049 S. 76th St., West Allis, Wis. 53219

Continuation of Ser. No. 859,861, May 1, 1986, abandoned, which is a continuation of Ser. No. 704,502, Feb. 22, 1985, abandoned. This application Jan. 5, 1987, Ser. No. 946,676
Int. Cl.[4] F23K *3/00*
U.S. Cl. 110—110 **21 Claims**



1. Apparatus for supplying comminuted combustible solid waste material from a refuse material supply to a combustion apparatus for use as fuel and wherein the combustin apparatus includes at least two fuel charging means each having a hopper for receiving comminuted combustible solid waste material,

and the hoppers being positioed in side-by-side relation, the apparatus comprising:

an auger housing mounted above the hoppers of the fuel charging means, the auger housing including an inner surface and a bottom having at least two openings, one of the openings positioned above one of the hoppers and the other opening positioned above the other of the hoppers whereby solid material can fall from the auger housing through the openings into the hoppers,

an auger mounted in said auger housing and supported therein for rotation around a central longitudinal axis so as to carry refuse material from one end of said auger housing toward an opposite end of said auger housing, said auger including a central auger tube and an auger flight surrounding said auger tube and fixed to said auger tube, said auger tube having a diameter of at least approximately 18 inches, said auger having a diameter of at least approximately 4 feet, and said auger including a periphery spaced from said inner surface of said auger housing by at least approximately 2 inches,

means for conveying solid waste material from the refuse material supply to said one end of said auger housing and including means for depositing refuse into said one end of said auger housing, and

a return conveyor mounted adjacent said opposite end of said auger housing and adapted to receive material from said opposite end of said auger housing.

4,686,914

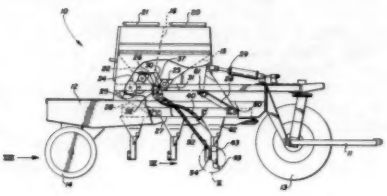
SEED PLANTER

David E. Schaaf, Lethbridge, and Fransesco M. Jorna, Nobleford, both of Canada, assignors to Versatile Corporation, Vancouver, Canada

Continuation of Ser. No. 530,882, Sep. 9, 1983, abandoned. This application Feb. 11, 1986, Ser. No. 828,580

Int. Cl.[4] A01C *5/08*

U.S. Cl. 111—73 **2 Claims**



1. A seed drill comprising a frame, seed feeding means, fertilizer feeding means, fertilizer tube means extending from said fertilizer feeding means and seed delivery tube means extending from said seed feeding means to a hoe point means, means for vertical adjustment of said seed tube means relative to said fertilizer tube means, said hoe point means being rigidly connected to a hoe bed means, said hoe bed means being pivotably connected to said frame, said hoe bed means having means allowing vertical adjustment of said hoe bed means relative to said frame, a packer wheel having a circumferential V-shaped ring portion following each of said hoe point means and being operable to compact soil within said furrow in a V-shaped configuration, said fertilizer tube means being operatively located behind said hoe point means to apply fertilizer within said furrow and said seed tube means being operatively located behind said hoe point means to deposit seed within said furrow, said seed and fertilizer being deposited prior to passage of said packer wheels, said seed tube means having an elliptical end portion, the longitudinal axis of said end portion extending transverse to the direction of seed drill movement and further having an interior seed divider, said divder being operable to divide seed for deposit on both sides of the centre line of said seed tube means and on opposite sides of said furrow.

4,686,915

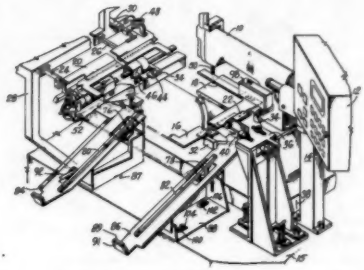
SEWING MACHINE SYSTEM HAVING AUTOMATIC PROCESSING OF SEWN WORK

Donald F. Herdeg, South Hamilton, and Lawrence P. Ciccia, Medford, both of Mass., assignors to USM Corporation, Farmington, Conn.

Filed Jun. 12, 1986, Ser. No. 873,739

Int. Cl.[4] D05B *21/00*; **D05C** *9/04*

U.S. Cl. 112—121.12 **24 Claims**



1. Apparatus for processing workpieces prearranged within pallets in an automatic sewing machine system, said apparatus comprising:

means for automatically positioning a workpiece prearranged within a pallet relative to a sewing needle;

means for dropping the front edge of a pallet containing a sewn workpiece from said means for automatically positioning the prearranged workpiece within a pallet; and

means for receiving the dropped front portion of the pallet whereby the dropped front portion of the pallet slides downwardly so as to allow the rear edge of the pallet to thereafter drop from said means for automatically positioning the prearranged workpiece.

19. Apparatus for processing workpiece holders containing sewn workpieces comprising:

a pair of inclined receiving means for receiving a dropped workpiece holder containing a sewn workpiece;

means, located within each receiving means, for absorbing the initial impact of a dropped workpiece holder; and

a slide, located within each receiving means, which allows the dropped workpiece holder to slide downwardly after contacting said means for absorbing the initial impact of a dropped workpiece holder.

4,686,916

TRANSPORT AND GUIDE FOR SEWING LIMP FABRIC

Anthony D. Mathias, Toorak, Australia, assignor to Dunlop Olympic Limited, Victoria, Australia

PCT No. PCT/AU85/00175, § 371 Date Mar. 25, 1986, § 102(e) Date Mar. 25, 1986, PCT Pub. No. WO86/00944, PCT Pub. Date Feb. 13, 1986

PCT Filed Jul. 25, 1985, Ser. No. 852,450

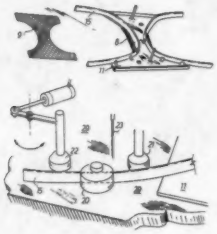
Claims priority, application Australia, Jul. 26, 1984, PG6238

Int. Cl.[4] D05B *21/00*

U.S. Cl. 112—121.12 **13 Claims**

1. An apparatus for guiding a limp fabric while a sewing operation is being performed thereon, comprising a substantially flat low friction surface to be located adjacent a sewing machine head substantially co-planar with the sewing plane of the sewing machine head upon which the fabric piece may be supported in a flat state, a transport member adapted to frictionally engage the exposed surface of the fabric piece at least along an area bordering said marginal portion so that at least part of the marginal portion is exposed, means to move said frictionally gripped area in a sliding movement along said surface, maintaining said part of the marginal portion flat, and

means to guide said transport member along a path to move said part of the marginal portion through the sewing machine head, wherein the transport member includes a plate member having a flat surface with at least part of said surface of a high friction material or coating and track means secured to said plate member including a portion contoured to substantially correspond to the contour of the marginal portion to be sewn



and the track means being located on the plate member so that the contoured portion is substantially parallel to the edge of the plate member from which the marginal portion projects, and wherein said moving means includes a roller assembly associated with said sewing machine head having at least one driving roller and arranged to cooperate with the track means to effect said sliding movement of the transport member along said path.

4,686,917

MATERIAL THICKNESS SENSING DEVICE FOR SEWING MACHINES

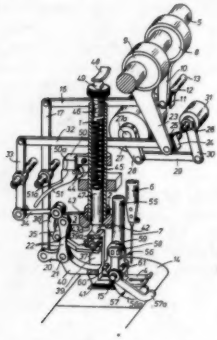
Oskar Braun, Kaiserslauttern, Fed. Rep. of Germany, assignor to Pfaff Industriemaschinen GmbH, Fed. Rep. of Germany

Filed Jul. 21, 1986, Ser. No. 888,768

Claims priority, application Fed. Rep. of Germany, Aug. 7, 1985, 3528295

Int. Cl.[4] D05B *29/02, 29/12, 27/24*

U.S. Cl. 112—311 **6 Claims**



1. A sewing machine thickness sensing device for sensing the thickness of material being sewn at a stitching point, comprising a pickup foot having a material engaging sensing surface, means mounting said pickup foot for vertical movement with its sensing surface lying on the material adjacent the point at which the stitch is formed, a sensing lever movably mounted on said pickup foot with a sensing arm portion lying on the material ahead of said sensing surface, and a measuring member connected to said sensing lever and movable in response to the movement of said sensing arm portion on the material to indicate changes of thickness of the material by detecting the relative movement between said pickup foot and said sensing lever.

4,686,918

METHOD AND APPARATUS FOR MAKING TUFTED BUFFING PADS OF VARIED DENSITY

William D. Hjalmer, and Hutchinson W. Carns, both of Chester, S.C., assignors to Schlegel Corporation, Rochester, N.Y.

Filed Jun. 10, 1986, Ser. No. 872,705

Int. Cl.[4] D05C *17/02*

U.S. Cl. 112—410 **2 Claims**

1. An improved tufted buffing pad comprising:

a backing pad; and

spiral or circular rows of pile secured to said backing pad in which the radially-extending distance between selected rows of pile is decreased to provide a selected high-wear area of the pad, and the radially-extending distance between other selected

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4,686,919

METHOD FOR CONSTRUCTING LARGE-SCALE MARINE STRUCTURE

Chiaki Kawai, Tokyo; Minoru Ohta, and Takahisa Inaba, both of Hisai, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

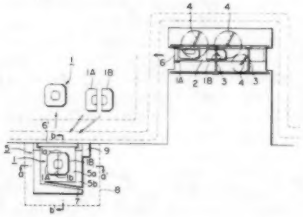
PCT No. PCT/JP85/00191, § 371 Date Dec. 5, 1985, § 102(e) Date Dec. 5, 1985, PCT Pub. No. WO85/04633, PCT Pub. Date Oct. 24, 1985

PCT Filed Apr. 12, 1985, Ser. No. 811,839

Claims priority, application Japan, Apr. 14, 1984, 59-75582

Int. Cl.[4] B63C *1/08*

U.S. Cl. 114—45 **1 Claim**



1. A method for constructing a single, large-scale, marine structure, comprising:

providing, near an existent dock of which at least one end faces a body of water through a gate, a pond having an end thereof facing said body of water through another gate, said pond having a bottom surface area sufficient to permit construction of a large-scale marine structure through assembly of a plurality of blocks for said large-scale marine structure, and said pond having a depth

sufficient to cause said large-scale marine structure thus constructed to float in said pond when said another gate is closed and water is introduced into said pond from said body of water until the water surface level in said pond becomes flush with the level of said body of water;

constructing said plurality of blocks for said large-scale marine structure, which plurality of blocks have a size corresponding to the construction capacity of said dock, in said dock from which water is discharged after closing said gate;

introducing water into said dock from said body of water until the water surface level in said dock becomes flush with the level of said body of water to cause said plurality of blocks to float in said dock, opening said gate of said dock, and towing out said plurality of blocks from said dock to said body of water;

introducing water into said pond from said body of water until the water surface level in said pond becomes flush with the level of said body of water, opening said another gate of said pond, towing said plurality of blocks towed out to said body of water into said pond from said body of water, and closing said another gate of said pond;

assembling said plurality of blocks towed into said pond so that portions thereof to be welded come into contact with each other, and tack-welding together said plurality of blocks in a floating state;

discharging water in said pond to cause said plurality of blocks thus tack-welded together to rest on the bottom of said pond;

fully welding together said plurality of blocks tack-welded together to construct said large-scale marine structure; and

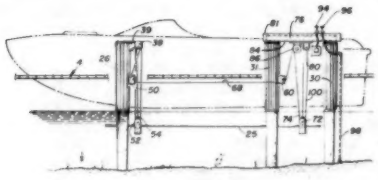
introducing water into said pond from said body of water until the water surface level in said pond becomes flush with the level of said body of water to cause said large-scale marine structure thus constructed to float in said pond, opening said another gate of said pond, and towing out said large-scale marine structure from said pond to said body of water.

4,686,920

CRADLE TYPE BOAT LIFTS

James L. Thomas, 1081 35th Ave., Vero Beach, Fla. 32960

Filed Nov. 24, 1986, Ser. No. 934,330
Int. Cl.[4] B63C *1/08*
U.S. Cl. 114—48 **6 Claims**



6. In a boat lift associated with a berth that includes permanently positioned piles at least some of which are in pairs spaced apart a distance sufficient to permit the boat to be berthed thereat to move between said paired piles while in the water at said berth, the improvement which comprises:

a cradle upon which said boat can be supported out of said water, said cradle including a first transverse member having an inside end and outside end and a second transverse member spaced apart from said first member having an inside end and outside end,

a first pair of said piles including first sheave means,

a second pair of said piles including second sheave means,

a third pair of said piles positioned between said first and second pairs adjacent said second second pair,

each of said pair of piles having an inside pile and an outside pile,

a first and second beams carried respectively by said inside and outside piles of said second and third pairs,

first and second motor driven winch drums supported respectively upon said first and second beams,

third sheave means carried by said first and second beams,

first inside and outside cables reeved respectively from said first and second drums via said first and second sheave means forward to said inside and outside piles of said first pair to lift said first transverse member, and

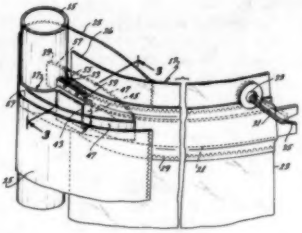
second inside and outside cables reeved respectively via said third sheave means from said first and second drums to lift said second transverse member.

4,686,921

FLEX WING APPARATUS

Jeffrey J. Magnan, San Clemente, Calif., assignor to Gaastra Sails International Limited, Hong Kong

Filed Mar. 28, 1984, Ser. No. 594,476
Int. Cl.[4] B63H *9/06*
U.S. Cl. 114—102 **15 Claims**



1. A flex wing apparatus comprising:

a support;

a mast coupled to the support and projecting therefrom;

a sail of flexible material, said sail having a leading edge and a trailing edge;

a plurality of resilient battens;

means on the sail for carrying the battens with the battens extending toward the leading edge of the sail;

first and second couplings for coupling first and second of the battens, respectively, to the mast for pivotal movement of the battens and sail about the mast, each of said first and second couplings including means for at least partially surrounding a region of the mast and pivotable about the mast, said first and second couplings resisting movement of the first and second battens toward said leading edge;

said first and second couplings being free of interlocking driving engagement with each other in the pivotable movement of the first and second couplings about the mast; and

means for resiliently deforming the battens varying magnitudes to induce the desired camber into the battens and the sail.

4,686,922

SWING WING KEEL

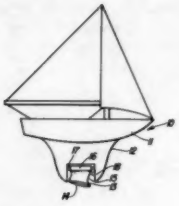
Ralph B. Burroughs, 31 Mellon Ave., Troy, N.Y. 12180

Filed Jun. 27, 1986, Ser. No. 879,396
Int. Cl.[4] B63B *39/02*
U.S. Cl. 114—124 **8 Claims**

1. In a sailing vessel having a hull adapted to float on a body of water and a central keel member attached to the hull thereof and projecting vertically downwardly therefrom into the water on which said hull rests, the improvement comprising, a swing wing for said keel,

(a) said swing wing comprising in combination a generally rectangular hydrofoil planar wing section having smoothly tapering leading and trailing edges,

(b) an upstanding generally rectangular web support section joined to said wing section at the longitudinal center thereof and transversely thereto, said web section being perpendicular to said wing section, said web section and said wing section defining a generally inverted T configuration,



(c) and mounting means on the upstanding end of said web section to suspend said swing wing so that the plane of said keel member is perpendicular to said wing section,

(d) said mounting means being adapted to suspend said swing wing in a pendulum arrangement during heeling motion of the vessel during which the said wing section attempts to take up and maintain a position parallel to the surface of the water on which said hull rests.

4,686,923

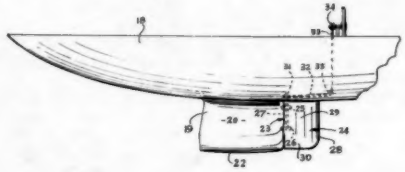
SAILBOAT KEEL HAVING A CANTILEVERED TRAILING EDGE FLAP

Leonard M. Greene, White Plains, N.Y., assignor to Safe Flight Instrument Corporation, White Plains, N.Y.

Filed Jul. 25, 1986, Ser. No. 889,165

Int. Cl.[4] B63B *3/38*

U.S. Cl. 114—140 **4 Claims**



1. A keel assembly for a sailboat, the sailboat being of the type having a single hull to which the keel assembly is attached and having a rudder attached to the hull, the rudder being separate from the keel assembly, and the sailboat having a longitudinal axis, comprising

a fixed keel affixed to the hull, the fixed keel having a vertical portion extending downward from the hull and having a longitudinal axis oriented parallel to the longitudinal axis of the hull, the vertical portion of the fixed keel having port and starboard sides, a trailing edge and a bottom and bottom edge, the fixed keel further having port and starboard wing-like appendages located near the bottom of the vertical portion of the fixed keel and extending respectively from the port and starboard sides of the vertical portion of the fixed keel, the wing like appendages extending in directions substantially transverse to the longitudinal axis of the boat,

a rotatably mounted flap, the flap having a main body, a cantilevered portion and a leading edge,

means for rotatably supporting the flap for rotation about an axis of rotation, the axis of rotation being adjacent to the leading edge of the flap and being located adjacent to the trailing edge of the vertical portion of the fixed keel.

the cantilevered portion of the flap extending downward from the main body of the flap and extending downward below the bottom edge of the vertical portion of the fixed keel,

means for adjusting and maintaining the angle of rotation of the flap so as to improve the lift to drag ratio of the keel assembly.

4,686,924

FENDER OR SIMILAR DEVICE FOR ABSORBING FORCES OF IMPACT

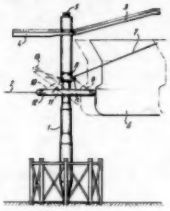
Leendert Poldervaart, La Turbie; Jean C. M. Personnat, Monte Carlo, both of Monaco, and Roland P. O. Quinti, Nice, France, assignors to Single Buoy Moorings Inc., Marly, Switzerland

Filed Nov. 5, 1985, Ser. No. 795,236

Claims priority, application Netherlands, Nov. 19, 1984, 8403519

Int. Cl.[4] B63B *59/02*

U.S. Cl. 114—219 **4 Claims**



1. In a fender for absorbing forces of impact coming from a mooring or moored floating device, such as a vessel, which fender is suspended from a mooring body anchored with respect to the water bottom and is of the type allowing the moored device to swing around it about a vertical axis of rotation, said fender comprising a single supporting structure, which surrounds said vertical axis of rotation and the mooring body by more than 180° and which is loaded by weights and which at least at the side of the device that is moored or to be moored is at a distance from the mooring body, which supporting structure at a plurality of locations is suspended from the mooring body by means of movable connecting members attached at points which are at a higher level than the supporting structure, said connecting members all converging upwardly toward a single point and being attached at at least one point on the mooring body which lies on or adjacent to the vertical axis of rotation; the improvement in which said upwardly converging connecting members comprise the only means which determine the movement of said supporting structure relative to the mooring body, whereby upon pressure being applied by a said floating device to the supporting structure, the side of the supporting structure to which said pressure is applied will swing down and the opposite side of the supporting structure will swing up.

4,686,925

ROTARY BOAT REPAIR APPARATUS

Andrew G. Stuck, 1190 Stead Dr., Menasha, Wis. 54952

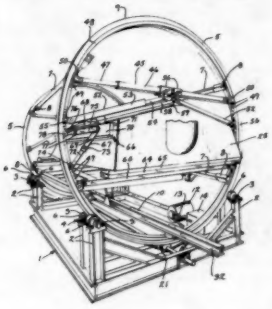
Filed Dec. 5, 1985, Ser. No. 804,829

Int. Cl.[4] B63B *9/00*

U.S. Cl. 114—224 **14 Claims**

1. A rotary boat repair apparatus, comprising a rack having a generally horizontal axis and an open end, means for mounting the rack for rotation about said axis, drive means for rotating said rack, hoist means for positioning a boat longitudinally within said rack, first clamping means interconnecting the

lower surface of the boat hull and said rack, second clamping means interconnecting the upper surface of the boat hull and said rack, and means for adjustably connecting both said first and second clamping means to said rack, said first clamping means including a first brace extending chordwise of said rack, a second brace connecting the rack to the central portion of said first brace and complementing the bottom surface of the



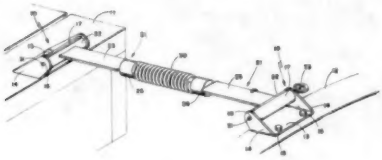
boat hull, and a third brace connecting the rack to the central portion of said first brace and complementing the bottom surface of said hull, said second and third braces being disposed in a generally V-shaped arrangement, clamping of said boat hull to the rack through operation of said first and second clamping means enabling the rack to be rotated to thereby position the hull at any desired inclination.

4,686,926

BOAT MOORING DEVICE

Duane R. Vance, 1247 Deerfield Dr., St. Paul, Minn. 55119

Filed Mar. 27, 1986, Ser. No. 844,516
Int. Cl.[4] B63B *21/00*
U.S. Cl. 114—230 **3 Claims**



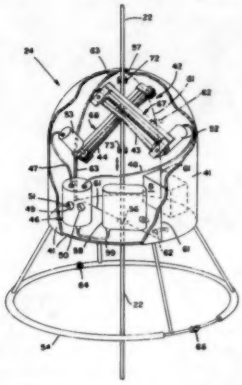
1. A device for mooring a boat to a dock, comprising:
a dock bracket and a boat bracket each comprising a flat base and spaced-apart upstanding side members attached to said base;
means for attaching said dock bracket base to a dock;
means for attaching said boat bracket to a boat;
a pair of elongated rigid arms;
means for pivotably attaching one of said arms at one end between the side members of said dock bracket;
means for pivotably attaching the other of said arms at one end between the side members of said boat bracket;
each of said arms having a cylindrical outer-threaded member fixedly attached to the other end;
an elongated helically wound spring member threadably engaged with a respective one of said cylindrical members at each end of said spring;
each of said pivotably attaching means comprising a semi-cylindrical sleeve member having a semicircular bearing surface attached between the bracket side members;
a trunnion on each of said arms resting on said sleeve bearing surface, each trunnion having an axial through passage;
each of said bracket side members having an opening axially aligned with said trunnion passage; and
a rod member extending through the openings in said bracket side members and through said trunnion passage.

4,686,927

TETHER CABLE MANAGEMENT APPARATUS AND METHOD FOR A REMOTELY-OPERATED UNDERWATER VEHICLE

Graham S. Hawkes, and David C. Jeffrey, both of Oakland, Calif., assignors to Deep Ocean Engineering Incorporated, Oakland, Calif.

Filed Feb. 25, 1986, Ser. No. 832,705
Int. Cl.[4] B63G *8/00, 8/24*
U.S. Cl. 114—312 **26 Claims**



1. A negatively buoyant tether cable management apparatus for use with a remotely-operated underwater vehicle deployed on a tether cable comprising:
a tether cable climbing assembly formed for mounting on said tether cable proximate said vehicle and having powered tether cable gripping means formed to grip and advance said cable management apparatus up and down said tether cable;
depth sensing means detecting the depth underwater at which climbing assembly is positioned; and
control means coupled to said climbing assembly and to said depth sensing means and formed to actuate and control the direction and extent of operation of said climbing assembly for climbing of said tether cable.

25. A method of propelling a movable one of a cable climbing assembly and a cable comprising the steps of:
engaging a side of said cable with a movable belt of said cable climbing assembly with said belt wrapped in a spiral path around a portion of the outer surface of said side at an acute angle to the longitudinal axis of said cable; and
advancing said belt while maintaining said cable in frictional contact therewith to produce relative movement between said cable and said climbing assembly along said longitudinal axis.

4,686,928

TOROIDAL WHISTLE

Richard J. Weisenberger, Rte. 12, Box 121, Lot 18, Paducah, Ky. 42001

Filed Mar. 14, 1986, Ser. No. 839,913
Int. Cl.[4] B06B *1/18*
U.S. Cl. 116—137 R **14 Claims**

1. A single-tone inverted toroidal whistle for producing a uni-directional output comprising:

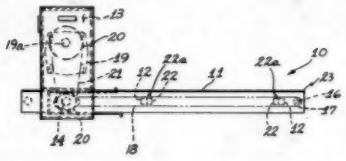
(a) a hollow cylinder having a closed base end, a cylindrical side wall and an open top end;
(b) the base end of said cylinder having a central circular aperture providing an inlet for passage of air or steam under pressure into the hollow interior of said cylinder;
(c) a circular plate positioned coaxially within said hollow cylinder parallel to said base end and spaced therefrom a distance equal to about one-quarter the inner diameter of said inlet, said plate having a substantially right-angled outer edge and being dimensioned to provide an annular opening between said edge and said cylinder;
(d) an annular flange projecting inwardly from said side wall of said cylinder toward said edge of said circular plate and occupying said annular opening, said flange having a tapered inner edge spaced about one-sixteenth inch from said outer edge of said plate, whereby to form an annular slit for passage of air or steam therethrough;
(e) a substantially toroidal body secured to said cylinder at said top end thereof, said toroidal body comprising an

annular cover secured to said top end of said cylinder and projecting inwardly substantially normal to said side wall thereof, and an inner cylindrical wall depending from said annular cover and defining an interior cavity, said inner wall being coaxial with said side wall of said cylinder and aligned with said annular slit and terminating in a tapered lip projecting toward and spaced from said annular slit;
(f) a phasing plug of parabolic axial cross-section secured to said plate and projecting into said interior cavity of said toroidal body in coaxial relation therewith; and
(g) an exponential horn attached to said toroidal body at the end thereof remote from the base end of said cylinder;
(h) said toroidal body and said side wall of said cylinder defining an annular sound chamber the working length of which is the distance between said annular flange and said annular cover, said working length determining the wavelength of sound generated by passage of air or steam under pressure through said annular slit and impinging against said tapered lip.

4,686,929
AZIMUTH ORIENTATION DEVICE
William L. Jensen, Jr., 32 Diana La., Beacon Falls, Conn. 06403
Filed Aug. 28, 1985, Ser. No. 770,278
Int. Cl.[4] G09F *9/37, 9/40*
U.S. Cl. 116—318 **2 Claims**

1. An easily manipulable hand operable device for use in visualization of relative orientations for steering operations to a final azimuth orientation in homing of a fluid craft having an axis of symetry and guidance system in making an approach in said homing comprising:
three planar surfaces represented by coaxial discs of different sizes with rims and hubs all relatively rotatable with respect to each other and disposed in separated parallel planes in decreasing disc size and forming two pairs of adjacent and juxtaposed disc combinations;
all three said rims of said discs lying in a surface formable by a conic-section rotated about an axes of revolution;
the hubs of said discs separated by two spacing sleeves of different sizes, the larger of said spacing sleeves separating the larger pair of said disc combinations
a rivet sandwiching and compressing together said discs and said sleeves;
a representation of said final orientation in said approach in said homing on the smallest disc of said discs of different sizes;
azimuth representations on the middle disc of said discs of different sizes graduated entirely around said middle disc;
the largest disc of said discs of different sizes merely having an index mark on at least one imaginary circle representative of said largest disc;
sleeve and rivet compression being adjusted to that frictional forces drag without slip the smallest disc when unbiased by torque about the axis of said disc with said representation of said final orientation of said approach with use of one hand by any drive rotation of the middle azimuth disc while allowing adjustment of said smallest disc with said representation of said final orientation relative to the azimuth disc with slip with proper manipulation by direction manual adjustment of the smallest disc, thereby allowing easy hand manipulation of the device for said steering operations; and;
the largest disc having its index mark and axis fixed with respect to said axis of symetry of the fluid aircraft.

4,686,930
SPRINKLE BELT
Paul Ritz, Marblehead, Ohio, assignor to Stein Associates, Inc., Sandusky, Ohio
Filed May 2, 1985, Ser. No. 729,811
Int. Cl.[4] B05C *19/00*
U.S. Cl. 118—24 **5 Claims**



1. In a conveyor type breading machine for coating food product pieces with flour type breading, said breading machine having an elevated hopper to supply flour for coating the top of said foot product, said hopper having a discharge means for metering the flour for top coating the food product as it passes therebelow on conveyor means; sprinkle means mounted below said discharge means and above said conveyor means, said sprinkle means operating to finely disperse metered flour falling from said discharge means toward the food product, whereby the top of the food product may be lightly and evenly coated with a uniform thickness of the flour, said sprinkle means comprising an endless open mesh wire belt movably mounted over said conveyor means and positioned to intercept the flour falling from said discharge means, said endless mesh belt including cross wires in the range of from about 42 to 72 wires per foot of belt length, motor means for driving said endless belt at a predetermined speed operative to move both

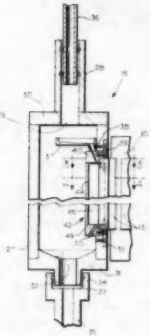
the upper and lower runs of said belt in a direction generally transverse to the direction of movement of said conveyor means, vibrating means engageable with said endless belt and operable to vibrate said endless belt as it moves relative to said conveyor means, movement of said endless belt operative to break up any clumps of flour emitted by said discharge means and provide a relatively fine even dust cloud of the flour for even coating of the underlying food product.

4,686,931

APPARATUS FOR APPLYING A SOLVENT TO PLASTIC LABELS

Frank J. DiFrank, Toledo, and Mark R. Tipping, Maumee, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Nov. 4, 1985, Ser. No. 795,052
Int. Cl.[4] B05C *1/02*
U.S. Cl. 118—50 **6 Claims**



1. An applicator roll for applying solvent at finite areas of a label being moved in tangential rolling contact with the roll where the labels are fed in series to and held to the surface of a rotating vacuum drum with its surface moving in solvent transfer relationship to the solvent applicator roll to thereby apply solvent to the label, the improvement in said applicator roll comprising a plurality of elongated, vertical, miniature gravure rolls set in the periphery of the applicator roll, each gravure roll being mounted for rotation about its vertical axis relative to said applicator roll with the periphery of each gravure roll extending slightly beyond the outer surface of the applicator roll, means connected to said applicator roll for rotating said applicator roll about its central vertical axis, and means for supplying solvent to the periphery of the gravure rolls.

4,686,932

APPARATUS FOR APPLYING A MODIFYING INGREDIENT TO OPEN-CELLED POLYURETHANE MATERIAL

Winslow L. Pettingell, Rotonda West, Fla., assignor to Foam Cutting Engineers, Inc., Addison, Ill.

Filed Feb. 20, 1986, Ser. No. 831,452
Int. Cl.[4] B05C *3/132*
U.S. Cl. 118—419 **20 Claims**

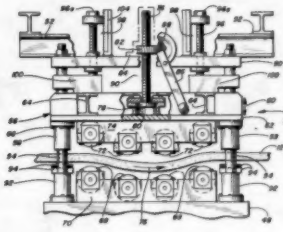
1. An apparatus for applying a modifying ingredient to a mass of open-celled polyurethane foam, comprising:

means for applying an excess of a liquid solution or dispersion of said modifying ingredient to the mass of foam; and

means for squeezing the mass to remove most of the excess liquid, including

fixed frame means mounting backing rollers means and movable frame means carrying pressure roller means for movement toward and away from the backing roller means,

singular first adjustment means for moving the movable frame means and, thereby, the pressure roller means toward the backing roller means to sandwich the mass therebetween, and



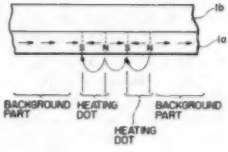
a plurality of second adjustment means at spaced locations about the roller means for adjusting the pressure between the backing roller means and the pressure roller means uniformly along the roller means.

4,686,933

MAGNETIC RECORDING IMAGE DEVELOPING APPARATUS

Yoshihiko Fujimura; Koichi Saitoh, and Yuji Suemitsu, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd, Japan

Continuation of Ser. No. 590,003, Mar. 15, 1984, abandoned. This application May 27, 1986, Ser. No. 867,627
Claims priority, application Japan, Mar. 17, 1983, 58-43259
Int. Cl.[4] G03G *15/09*
U.S. Cl. 118—623 **12 Claims**



1. An apparatus for developing a latent magnetic image on a moving magnetic recording medium, comprising:

a moving magnetic recording medium having a uniformly magnetized background and reversal magnetized image regions;

a developing magnet positioned adjacent said magnetic recording medium, the magnetic field produced by said developing magnet at the point of closest approach to said magnetic recording medium being the same direction as the magnetic field at the leading edge boundary between the background regions and the image regions on said magnetic recording medium in the direction of movement of said magnetic recording medium;

a rotating nonmagnetic sleeve positioned around said developing magnet with a gap between an outer surface of said sleeve and said magnetic recording medium; and

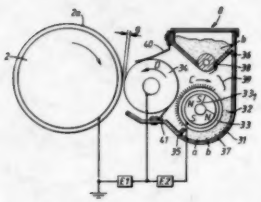
means for supplying magnetic toner to said sleeve.

4,686,934

DEVELOPING DEVICE

Mitsuaki Kohyama, Higashikurume, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 775,396, Sep. 12, 1985, abandoned. This application Aug. 14, 1986, Ser. No. 896,565
Claims priority, application Japan, Oct. 29, 1984, 59-227411
Int. Cl.[4] G03G *15/06*
U.S. Cl. 118—651 10 Claims



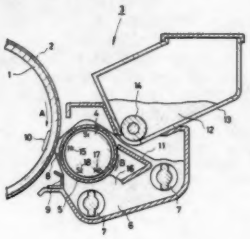
1. A developing device comprising:
(a) a casing enclosed but for a single opening;
(b) a developing roller mounted in said casing and protruding through the single opening in said casing;
(c) a developer bearing roller mounted in said casing in operative association with said developing roller;
(d) first means for rotating said developing roller in a first direction;
(e) second means for rotating said developer bearing roller in a second direction, opposite to said first direction;
(f) third means for creating a difference in electrical potential between the surface of said developing roller and the surface of said developer bearing roller;
(g) a first elastic blade having a fixed end and a free end, said first elastic blade being mounted on said casing above said developing roller and, during use of the device, making resilient sliding contact with toner particles on the surface of said developing roller intermediate its fixed end and its free end and across at least substantially the entire width of the single opening in said casing, whereby said first elastic blade extends both forwardly of and rearwardly of the line of contact between said first elastic blade and the toner particles and thereby prevents scattering of the toner particles outside said casing;
(h) a second elastic blade having a fixed end and a free end, said second elastic blade being mounted on said casing beneath said developing roller and, during use of the device, making resilient sliding contact with toner particles on the surface of said developing roller intermediate its fixed end and its free end and across at least substantially the entire width of the single opening in said casing, whereby said second elastic blade extends both forwardly of and rearwardly of the line of contact between said second elastic blade and the toner particles and thereby prevents scattering of toner particles outside said casing; and
(i) a thickness regulating plate projecting from said casing and extending toward but not contacting said developer bearing roller.

4,686,935

DEVELOPING DEVICE

Toshikazu Matsui, Kishiwada; Akira Fushida, Suita; Nobuyasu Honda, Tenri; Minoru Nakao, Kashiba, and Nobuyuki Tsuji, Kakogawa, all of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Filed Jul. 30, 1985, Ser. No. 760,587
Claims priority, application Japan, Jul. 30, 1984, 59-157169
Int. Cl.[4] G03G *15/09*
U.S. Cl. 118—658 6 Claims



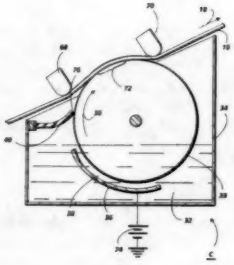
1. In a development device comprising a development sleeve of a non-magnetic material, a magnet having a plurality of magnetic poles and fixed within the sleeve, a mechanism for rotating the sleeve, a mechanism for agitating a developer composed of a magnetic carrier and a chargeable toner and supplying it to the sleeve, a mechanism for adjusting a magnetic brush formed on the sleeve to a predetermined brush length and supplying it to a development zone, and a mechanism for scraping off the magnetic brush which has gone past the development zone from the sleeve, said magnetic poles consisting of a main pole for development corresponding to the development zone and poles for conveying corresponding to a conveying zone ranging from the position of supplying the developer to the position of cutting the magnetic brush, the improvement wherein said magnetic brush is composed of said magnetic carrier, which is a ferrite carrier and said chargeable toner, and each said magnetic pole for conveying has a magnetic flux density 55 to 80% of that of the main pole for development.

4,686,936

LIQUID DEVELOPMENT SYSTEM

Che C. Chow, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 22, 1986, Ser. No. 865,711
Int. Cl.[4] G03G *15/10*
U.S. Cl. 118—661 8 Claims



1. An apparatus for developing a latent image recorded on a flexible belt with a liquid developer material comprising at

least a liquid carrier having marking particles dispersed therein, including:

means for storing a supply of liquid developer material;

a gravure, roll at least partially immersed in the supply of liquid developer material in said storing means, for advancing liquid developer material from said storing means to the latent image at a development zone, said flexible belt being wrapped about a portion of the exterior circumferential surface of said gravure roll so that the developement zone is an extended development zone;

an electrode positioned closely adjacent said gravure roll and immersed in the supply of liquid developer material to define a channel therebetween having liquid developer material therein; and

means for electrically biasing said electrode to cause a portion of the marking particles in the liquid developer material in the channel to move through the liquid developer material onto the surface of said gravure roll so as to increase the density of marking particles deposited on said gravure roll.

4,686,937

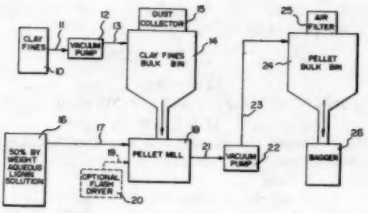
CAT BOX LITTER AND PROCESS FOR PRODUCING SAME

John Rosenfeld, 500 Keele Street, Toronto, Ontario, Canada M6N 3C9

Filed Dec. 11, 1984, Ser. No. 680,527

Int. Cl.[4] A01K *1/015*

U.S. Cl. 119—1 **20 Claims**



1. A process for making pellets from clay "fines" having open pore spaces therein, said fines including particles that will pass through a 30–50 mesh screen, said process comprising:

a. mixing said clay "fines" in a mixing apparatus with an aqueous solution of lignin;

b. transferring said moistened clay-lignin particles from said mixing apparatus to a disc pelletizer having a die and a screw conveyor to feed said moistened clay-lignin particles to said die, said die including a die stiffener ring, a roll assembly, an adjustable feed plow and a rapid pelletizing cartridge; and

c. forcing said moistened clay-lignin particles through said die to compact and to form said clay-lignin into particles into a coherent mass of material and cutting said coherent mass from said die to form said material into pellets, said forcing through said disc pelletizer being under selected conditions of shear, substantially simultaneously to compact said clay-lignin particles into said coherent mass and to flash-off excess moisture to provide pellets having a maximum of about 5% by weight moisture, a subsequent drying step therefore being rendered unnecessary;

said pellets having open pore spaces therein and a liquid absorptive capacity in said open pore spaces substantially equal to the capacity of said clay "fines" starting material.

4,686,938

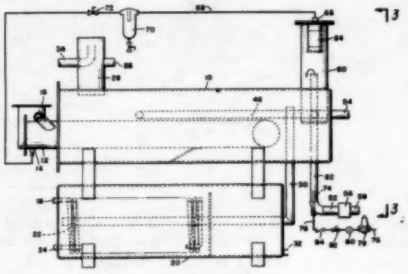
SYSTEM FOR HEATING LIQUID IN A SEPARATOR

James E. Rhodes, Farmington, N. Mex., assignor to Process Equipment & Service Co., Inc., Farmington, N. Mex.

Filed Sep. 26, 1986, Ser. No. 917,970

Int. Cl.[4] B09B *3/00*

U.S. Cl. 122—4 R **13 Claims**



1. A system for heating a liquid in a separator comprising:

a separator vessel having a produced gas/liquid inlet and gas and liquid outlets and having a closed fluid flow loop within the separator in heat transfer relationship with the liquid in the separator;

a regenerator vessel having a wet desiccant inlet, a dry desiccant outlet, and a water vapor outlet;

a gas fired burner within said regenerator providing means to heat the desiccant therein, the burner having a pilot light and a gas inlet to the pilot light;

a closed fluid flow loop within said regenerator vessel in heat transfer relationship to the desiccant therein, the fluid flow loop in said regenerator vessel being in closed communication with said fluid flow loop in said separator vessel providing a closed heat transfer system between the liquid in said separator vessel and the desiccant in said regenerator vessel, the closed heat transfer system being filled with a heat transfer fluid;

a fluid flow eductor in series with said closed heat transfer system having a gas inlet and a gas outlet, the gas inlet being connected to a source of combustible gas under pressure and the gas outlet being connected to said gas fired burner pilot light, the flow of gas to said pilot light tending to cause circulation in said closed heat transfer system;

a thermostatic means for detecting the temperature of the liquid within said separator vessel; and

a valve controlled by said thermostatic means in series with said closed heat transfer system, the valve opening in response to a preselected low temperature as detected by said thermostatic means to thereby allow fluid to flow in said closed heat transfer system and closing in response to a preselected high temperature as detected by said thermostatic means.

4,686,939

FAST FLUIDIZED BED BOILER AND A METHOD OF CONTROLLING SUCH A BOILER

Lars A. Strömberg, Nyköping, Sweden, assignor to Studsvik Energiteknik AB, Nyköping, Sweden

Division of Ser. No. 552,130, filed as PCT SE83/00089, Mar. 15, 1983, published as WO83/03294, Sep. 29, 1983, Pat. No. 4,538,549.

This application Jul. 15, 1985, Ser. No. 754,988

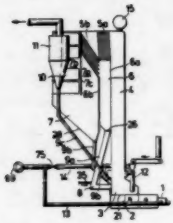
Claims priority, application Sweden, Mar. 15, 1982, 8201632-0

Int. Cl.[4] B09B *3/00*

U.S. Cl. 122—4 D **4 Claims**

1. In a process for operating a fast fluidized bed boiler including a reactor, means for establishing a fluidized bed within

the reactor, a primary particle separator connected to the reactor for receiving a gas-particle mixture from the reactor, the improvement comprising mechanically separating particles in the primary particle separator from the gas-particle mixture



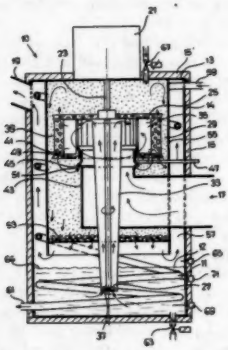
in a non-centrifugal mechanical separator of the general labyrinth type wherein the particles are separated in two dimensions and recirculating separated particles to the reactor through a path external of the reactor.

4,686,940

DEVICE FOR HEATING A FLUID AND FOR CLEANING WASTE GASES FROM HEATING SYSTEMS

Jorg Fullemann, Mastrils, Switzerland, assignor to VTH AG, Liechtenstein

Filed Jul. 8, 1985, Ser. No. 752,762
Claims priority, application Switzerland, Jul. 9, 1984, 3309/84
Int. Cl.[4] F22B *1/02*
U.S. Cl. 122—31 R **11 Claims**



1. A device for heating a fluid and for cleaning a waste gas resulting from combustion, said device comprising:

a container having a waste gas inlet through which gas is introduced into said container;

spraying means for spraying liquid into said waste gas introduced into said container;

heat exchanger means disposed in said container for transferring heat between said waste gas introduced into said container and a fluid-to-be-heated, said fluid-to-be-heated being kept out of direct contact with the liquid sprayed into said waste gas;

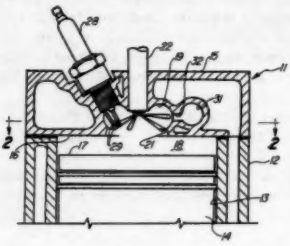
moving means for moving waste gas through said container and recirculating means for recirculating waste gas through said container wherein said moving means and said recirculating means comprise a single fan means which also serves as said spraying means.

4,686,941

TURBULENCE GENERATOR FOR TWO-STROKE SPARK-ASSISTED DIESEL ENGINES

Susumu Ariga, San Antonio, Tex., assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Apr. 1, 1986, Ser. No. 846,905
Int. Cl.[4] F02B *3/00*
U.S. Cl. 123—26 **5 Claims**



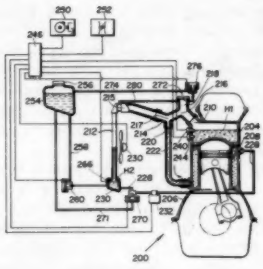
1. A method for operating an internal combustion engine on a diesel cycle having a compression ratio substantially less than 17 to 1 and about 12 to 1 comprising the steps of injecting sufficient fuel into a main chamber portion from a central position outwardly therein to form a stoichiometric charge therein and into an energy cell portion having a restricted communication with the main chamber portion, initiating fuel combustion first in the main chamber portion for generating an increased pressure therein, said increased pressure being of sufficient magnitude to cause auto ignition of the fuel/air charge in the energy cell after the initiation of combustion in said main chamber portion for substantially increasing the pressure in said energy cell and for causing a high pressure charge to flow through the orifice into the main chamber portion for generating turbulence therein.

4,686,942

COOLING SYSTEM FOR AUTOMOTIVE ENGINE OR THE LIKE

Yoshimasa Hayashi, Kamakura, and Yasuhiro Murakami, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jul. 3, 1985, Ser. No. 751,537
Claims priority, application Japan, Jul. 4, 1984, 59-138815
Int. Cl.[4] F01P *3/22*
U.S. Cl. 123—41.21 **9 Claims**



1. In an internal combustion engine: a structure subject to high heat flux a cooling system for removing heat from said structure, said system comprising:

(a) a cooling circuit including:

(i) a coolant jacket formed about said structure and into

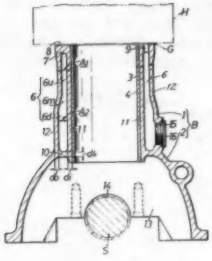
which coolant is introduced in liquid form and permitted to boil;
(ii) a radiator in which gaseous coolant is condensed to its liquid state;
(iii) a vapor manifold fluidly communicating with said coolant jacket;
(iv) a vapor transfer conduit leading from said vapor manifold to said radiator;
(v) means defining a liquid coolant collection section in said vapor manifold into which liquid coolant emitted from said coolant jacket is collected;
(vi) means defining a drain port in said collection section;
(vii) a drain conduit leading from said drain port to said coolant jacket;
(viii) coolant return means for returning liquid coolant from said radiator to said coolant jacket in a manner to maintain said structure immersed in a predetermined depth of liquid coolant including:
a level sensor disposed in said coolant jacket at a level which is higher than said structure subject to high heat flux;
a coolant return conduit which leads from the bottom of said radiator to said coolant jacket;
a coolant return pump disposed in said coolant return conduit, said coolant return pump being responsive to said sensor to pump coolant from said radiator to said coolant jacket in a manner to maintain the level of coolant in said coolant jacket at that of said level sensor;
(b) a reservoir containing liquid coolant; and
(c) valve and conduit means for selectively interconnecting said cooling circuit with said reservoir.

4,686,943

CLOSED-DECK CYLINDER BLOCK FOR WATER-COOLED INTERNAL COMBUSTION ENGINES

Nobuo Anno, and Takeo Arai, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 3, 1985, Ser. No. 804,296
Claims priority, application Japan, Dec. 3, 1984, 59-255299; Dec. 6, 1984, 59-258152
Int. Cl.[4] F01P *3/02*
U.S. Cl. 123—41.74 **8 Claims**



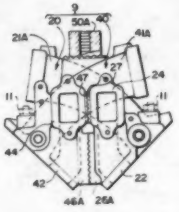
1. A closed-deck cylinder block of a light alloy for use in a water-cooled internal combustion engine, comprising:
an integrally cast block having a cylinder-defining portion and a crankcase-defining portion;
said cylinder-defining portion having a plurality of cylinder bores defined therein;
said cylinder-defining portion including a water jacket extending substantially the entire length of each of said cylinder bores and defined by an inner side wall, an outer side wall spaced therefrom, an upper wall interconnecting at least substantial portions of upper ends of said inner and outer side walls forming a closed-deck construction, and a bottom wall interconnecting said inner and outer side walls, said bottom wall having a wall thickness substantially equal to at least one of the wall thicknesses of said inner and outer side walls.

4,686,944

INTAKE MANIFOLD STRUCTURE FOR V-TYPE ENGINE

Tetsuo Hiraoka; Koichi Hatamura, and Sigeyasu Yamamoto, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Japan

Filed Apr. 18, 1986, Ser. No. 853,755
Claims priority, application Japan, Apr. 22, 1985, 60-60515[U]
Int. Cl.[4] F02B *75/18*
U.S. Cl. 123—52 MV **9 Claims**



1. In an intake system for a V-type engine having a plurality of cylinders in each of first and second cylinder banks, a plurality of intake ports each of which is communicated with one of the cylinders being open in the inner surfaces of the cylinder banks opposed to each other,
an intake manifold structure for forming discrete intake passages which are separately communicated with the respective intake ports to introduce intake air into the cylinders corresponding thereto, comprising a first piece which is provided with a plurality of discrete passages each forming one of said discrete intake passages communicated with the intake ports of the first cylinder bank and a connecting portion for integrally connecting the discrete passages at a portion near the first cylinder bank; a second piece which is provided with a plurality of discrete passages each forming one of said discrete intake passages communicated with the intake ports of the second cylinder bank and a connecting portion for integrally connecting the discrete passages at a portion near the second cylinder bank; and a fastening means for fastening together the first and second pieces so that the passages of the first and second pieces are alternately positioned in the direction of the row of the cylinders and cross each other between the first and second cylinder banks.

4,686,945

VALVE STRUCTURE FOR AN INTERNAL COMBUSTION ENGINE

Takashi Inagaki, and Shinichi Nakano, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

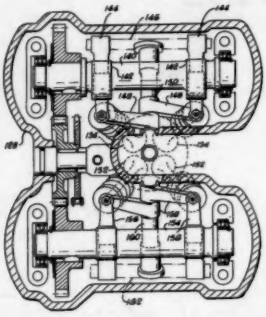
Continuation of Ser. No. 545,667, Oct. 26, 1983, abandoned. This application Nov. 4, 1985, Ser. No. 794,588
Claims priority, application Japan, Oct. 26, 1982, 57-163013
Int. Cl.[4] F01L *1/18*
U.S. Cl. 123—90.22 **5 Claims**

2. A valve assembly for an internal combustion engine, including a combustion chamber having an axial centerline and a crankshaft having an axis perpendicular to the axial centerline of the combustion chamber, said valve assembly comprising
two intake valves;
two exhaust valves;
two camshafts positioned parallel to the crankshaft and on

opposite sides of the axial centerline, one of said camshafts being associated with said intake valves and the other of said camshafts being associated with said exhaust valves;

a primary rocker arm for each of said intake and exhaust valves, each of said rocker arms associated with said intake valves being pivotally mounted on a first common pivotal axis and each of said rocker arms associated with said exhaust valves being pivotally mounted on a second common pivotal axis, said axes being parallel to the camshafts and said primary rocker arms being biased against said camshafts;

a secondary rocker arm for each of said intake and exhaust valves, each of said secondary rocker arms for said intake



valves being pivotally mounted at a common pivotal axis to extend to said valve and being driven by one of said primary rocker arms and each of said secondary rocker arms for said exhaust valves being pivotally mounted at a common pivotal axis to extend to said valve and being driven by the other of said primary rocker arms; and

an intake mounting shaft for pivotally mounting both of said secondary rocker arms associated with said intake valves;

an exhaust mounting shaft for pivotally mounting both of said secondary rocker arms associated with said exhaust valves, said intake mounting shaft being located centered between said intake valves and said exhaust mounting shaft being located centered between said exhaust valves.

4,686,946

VALVE MOVING SYSTEM OF AN OVERHEAD VALVE ENGINE

Tatsutoshi Umeda; Yoshio Tani; Takeshi Kaai; Keiichi Nakano, and Yoshio Izui, all of Osaka, Japan, assignors to Kubota Limited, Osaka, Japan

Continuation of Ser. No. 704,956, Feb. 25, 1985, abandoned. This application Apr. 29, 1986, Ser. No. 858,831

Claims priority, application Japan, Apr. 27, 1984, 59-63684[U]; May 25, 1984, 59-107071

Int. Cl.[4] F01L *1/12;* **F01M** *9/10*

U.S. Cl. 123—90.41 **8 Claims**

1. An air-cooled overhead valve engine comprising:

a cylinder head;

a cylinder head cover removably attached to said cylinder head;

an inlet valve;

an exhaust valve;

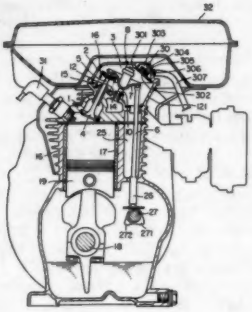
first and second push rods;

a rocker arm chamber formed between said cylinder head and said cylinder head cover;

first and second rocker arms having a tapered shape disposed in said rocker arm chamber, wherein said first rocker arm is coupled to said inlet valve and an upper end of said first push rod, and said second rocker arm is coupled to said exhaust valve and an upper end of said second push rod, wherein said inlet valve and said exhaust valve are inclined toward said upper end of said first and second push rods, and said push rods being disposed a distance from one another which is greater than a second distance between said valves, a pair of cams operatively connected to said push rods, a third distance between said cams being equal to the distance between said push rods;

first and second knuckle type footing bolt means for supporting said first and second rocker arms, respectively;

a pair of bosses for receiving a stem portion of said inlet and exhaust valve, said bosses being disposed above said footing bolts;



a breather, disposed under said cylinder head cover and positioned laterally outside of said push rods within said rocker arm chamber;

a combustion chamber disposed below said inlet and exhaust valve: and

an ignition plug having a discharge electrode and a main body, said discharge electrode being disposed above said combustion chamber and opposite one of said push rods, and said main body projecting outwardly from said cylinder head.

4,686,947

HYDRAULIC CUP-SHAPED VALVE TAPPETS

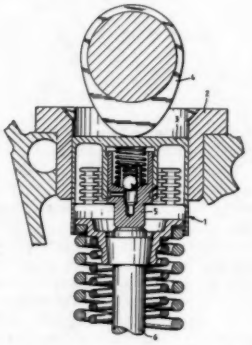
Walter Speil, Ingolstadt, Fed. Rep. of Germany, assignor to Motomak Motorenbau, Maschinen-und Werkzeugfabrik, Konstruktionen GmbH, Fed. Rep. of Germany

Filed Mar. 5, 1986, Ser. No. 836,243

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1985, 3511501

Int. Cl.[4] F01L *1/24*

U.S. Cl. 123—90.58 **8 Claims**



1. An hydraulic cup-shaped valve tappet for internal com-

bustion engines with an overhead camshaft comprising an outer hollow cylindrical housing (7) closed at one end by a bottom (3) in which is provided, concentrically radially spaced, a guide tube starting from the bottom, and in which is supported a longitudinally moveable plunger (5) of an hydraulic clearance compensation element, against the face thereof the end of a valve stem is abutting, a control cam (4) abutting against the bottom of the housing, characterized in that in the circular space between the cylindrical internal surface of the housing (7) and the external surface of the guide tube (8) a bellow element (16,21,25,31) is provided, said element being tightly connected, on the one hand, with the internal surface of the housing (7) and, on the other hand, with an end of the plunger (5) projecting from the guide tube (8) which is capable to simultaneously take up variations in length and in volume and which together with the remaining tappet components define an oil-filled internal space completely closed outwardly.

4,686,948

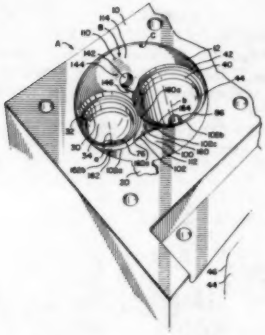
HEAD FOR HIGH PERFORMANCE INTERNAL COMBUSTION ENGINE

Richard W. Smith, Jr., and Michael E. Smith, both of Wooster, Ohio, assignors to TFS, Inc., Wooster, Ohio

Filed Jul. 29, 1985, Ser. No. 759,747

Int. Cl.[4] F02B *23/08*

U.S. Cl. 123—193 H **19 Claims**



1. In a cast head for an high performance internal combustion engine of the type using an atomized mixture of air and liquid fuel, said head including a flat mounting surface and having, for each of several in-line circular piston areas, (a) a wedge type combustion chamber extending from a head mounting surface and defined by a flat quenching surface coplanar with said mounting surface and extending generally along a chord of said circular piston area, and a concave, contoured wedge-shaped cavity forming surface, said wedge-shaped cavity tapering outwardly from said quenching surface between a shallow chordal area adjacent said quenching surface and a deeper valving area removed from said quenching surface; (b) a circular exhaust valve seat defining an exhaust outlet at said deeper valving surface and having a first axis; (c) a circular intake valve seat defining an intake inlet at said deeper valving surface and having a second axis; (d) an exhaust passage extending from said exhaust outlet with a first passage portion extending generally axially of said first axis and a second elongated outlet passage portion with a general axial centerline forming a first angle with said first axis; (e) an intake passage extending to said intake inlet with a first passage portion extending generally axially of said second axis and a second elongated inlet passage portion with a general axial centerline forming a second angle with said second axis for introduction of an atomized mixture of air and fuel into said combustion chamber through said intake inlet; and, (f) a spark plug receiving bore in said cavity forming surface generally between said first and second axes, an improvement for obtaining, at 5000 RPM, a brake specific fuel consumption of substantially below 0.50 Lbs/BHp-Hr and a brake horsepower of over 400 Hp, said improvement comprising:

(g) said first and second axes being located adjacent a diameter defined by said circular piston area and on a line generally parallel with said chord of said quenching surface;

(h) said valve seats being at an angle of less than about 15° from said flat quenching surface whereby said first and second axes are at an angle of less than about 15° from said quenching surface and the lower end of said intake valve seat being spaced vertically from said flat quenching surface only a slight distance;

(i) said cavity forming surface at said deeper area having the general contour of two parallel intersecting, truncated cones generally concentric to said first and second axes with a gradually contoured surface section between said cones at the deeper valving area of said cavity forming said combustion chamber;

(j) a velocity increasing protuberance in said combustion chamber at said shallow chordal area of said cavity, said protuberance including an edge portion, said edge portion further defined by a first and second arcuate portion generally concentric with said first and second axes, respectively, and a continuously smoothly curved intermediate edge portion inbetween said first and second edge portions extending in an inwardly concave direction into said chamber; and,

(k) said cavity forming surface adjacent said intermediate edge portion and between the peripheral portions of said intake and exhaust valve seats which are facing one another further defined by an inwardly, generally smoothly curved convex surface adjacent said intermediate edge portion blending into an inwardly concave surface adjacent said peripherally facing portions of said intake and said exhaust valve seats to provide for an improved gas mixture and exhaust mixture flow past said seats without detrimental turbulence.

4,686,949

SPARK IGNITED INTERNAL COMBUSTION ENGINES

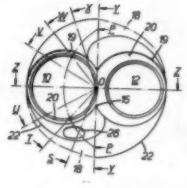
Anthony R. Glover, Brighton, and David W. Grigg, East Preston, both of England, assignors to Ricardo Consulting Engineers Plc., England

Filed Jan. 25, 1985, Ser. No. 695,172

Claims priority, application United Kingdom, Jan. 25, 1984, 8401928

Int. Cl.[4] F02B *23/08*

U.S. Cl. 123—306 **16 Claims**



1. A cylinder for a spark-ignited internal combustion engine, said cylinder comprising a piston, a cylinder head, and an inlet port; said cylinder head and said piston having opposed surfaces which together define a combustion chamber; said inlet port comprising means for producing swirl in combustion charges inlet by said port into said combustion chamber during the inlet stroke of said piston; said combustion chamber-defining surfaces having a configuration which divides, re-shapes, and guides the swirling combustion charges from said inlet port means into two distinct and separate swirl patterns in response to the compression stroke of said piston; said chamber-defining surfaces establishing each of said two swirl pat-

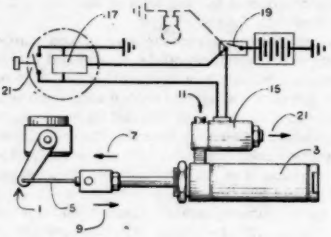
terns in separate portions of said combustion chamber and imparting to each the same rotational sense; and said chamber-defining surfaces guiding said two separate and distinct swirl patterns into mutually-intersecting interference collision with one another in a predetermined location within said combustion chamber to produce intense turbulation involving substantially all of the inlet charges at said predetermined location.

4,686,950

ENGINE IDLE ADVANCE

Erwin E. Hurner, 320 Eighth St. West, West Fargo, N. Dak. 58078

Filed Jul. 21, 1986, Ser. No. 887,264
Int. Cl.[4] F02D *11/10*
U.S. Cl. 123—339 **2 Claims**



1. In an internal combustion engine having a throttle to control the fuel flow to said engine, said engine having a predetermined idle speed, the improvement comprising:

an air actuated cylinder;

a linkage between said cylinder and said throttle whereby actuation of said air actuated cylinder moves said linkage and opens said throttle to increase the flow of fuel to said engine and increase the revolutions per minute thereof;

a solenoid valve for controlling the flow of air into and out of said cylinder; and

a control module for controlling said solenoid valve including a control module for causing periodic actuation and non-actuation of said air actuated cylinder whereby said internal combustion engine is periodically operated at a speed higher than said pretermined idle speed during periods of idle to reduce the accumulation of combustion products in said internal combustion engine; and

said internal combustion engine being operatively associated with a vehicle having parking brake means whereby actuation of said parking brake means actuates said control module.

4,686,951

METHOD AND APPARATUS FOR CARBURETION

Warren E. Snyder, Elm Grove, Wis., assignor to Dresser Industries, Inc., Dallas, Tex.

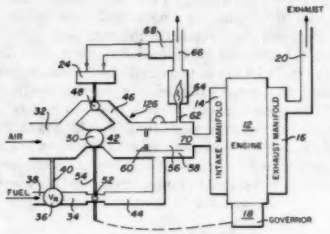
Filed Jun. 24, 1985, Ser. No. 747,838
Int. Cl.[4] F02D *41/14*; F02M *21/04*
U.S. Cl. 123—527 **5 Claims**

1. An improved carburetor for a gaseous fueled engine wherein said engine includes an intake manifold and a fuel supply, said carburetor comprising:

a body having inlet and outlet ends, an air passageway extending therethrough intersecting said ends, a fuel supply passageway for connection with said fuel supply, and a mixing chamber located adjacent to said outlet end and communicating with said air and fuel supply passageways;

fuel and air control means located in said fuel supply and air passageway, respectively, for conjointly controlling flow through said passageways, said fuel and air control means including an air valve member located in said air passageway upstream of said mixing chamber, a fuel valve member located in said supply passageway upstream of said mixing chamber, and including a shaft rotatable in said body having both valve members mounted thereon for conjoint movement with said shaft; and,

auxiliary control means for varying the air/fuel ratio to the intake manifold, said auxiliary control means including an



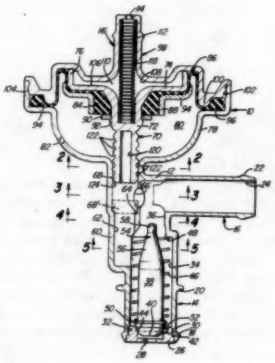
auxiliary air passageway in said body extending from adjacent said inlet end to said mixing chamber a valve member located in said auxiliary air passageway upstream of said mixing chamber, and a shaft rotatable in said body having said last mentioned valve member mounted thereon.

4,686,952

CONTROLLED PCV VALVE

Thornton W. Zeigler, Jr., Huntsville; Chris S. Romanczuk, Madison; Joseph T. Betterton, Arab, and Alfred H. Glover, Decatur, all of Ala., assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed Dec. 22, 1986, Ser. No. 944,312
Int. Cl.[4] F02B *25/06*
U.S. Cl. 123—572 **7 Claims**



1. A positive crankcase ventilation control device for use with an internal combustion engine and, specifically, for controlling the flow of emission laden vaporous fluids from the crankcase thereof, the control device including selective power means for substantially increasing the flow of emission laden air through the device, comprising:

a generally hollow housing with an inlet forming portion adapted to be fluidly connected to the interior spaces of an internal combustion engine to receive emission laden air therefrom;

the housing having an outlet forming device adapted to be fluidly connected to the air and fuel inletting portion of the internal combustion engine for disposing of the emission laden air from the engine, the inlet and outlet portions

being connected within the interior of the housing by a flow control passage of specific flow area;

an elongated valve plug member within the housing and having an end portion with a conically tapered configuration adapted to move progressively into the aforesaid flow control passage thereby decreasing the flow area thereof and, consequently, the total flow through the device;

yieldable means urging the elongated valve member toward a position ensuring maximum flow through the flow control passage, but being yieldable to allow the valve member to move so that the conically tapered portion progressively extends further into the flow control passage to thereby decrease the flow area and, consequently, decrease total flow through the device in response to a negative pressure differential of the outlet with respect to the inlet;

a bypass passageway formed in the housing in parallel with the aforesaid flow control passage thereby allowing a relatively large increased flow of fluid from the inlet to the outlet when the bypass passageway is unrestricted;

a bypass valve normally positioned to block flow through the bypass passageway, but capable of movement to allow a substantially uninhibited flow therethrough;

selectively energized power means for moving the bypass valve from the blocking position to a position allowing substantially increased flow between the inlet and outlet of the device whenever such increased flow is desirable.

4,686,953

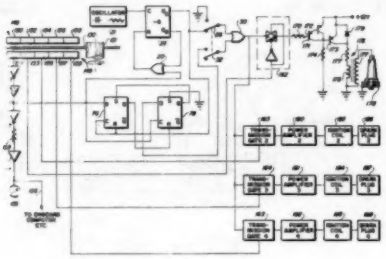
HIGH PERFORMANCE DISTRIBUTORLESS DIGITAL IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES

Craig R. Brown, Phoenix, Ariz., assignor to Stanley L. Dembecki, Phoenix, Ariz.

Continuation-in-part of Ser. No. 850,594, Apr. 11, 1986. This application Jun. 30, 1986, Ser. No. 880,140

Int. Cl.[4] F02P *1/00*

U.S. Cl. 123—606 **5 Claims**



1. A spark ignition system for a multi-cylinder internal combustion engine comprising:

(A) a free running source of pulses which periodically switch between logic "high" and logic "low" levels;

(B) engine angular position sensing means for generating a plurality of cylinder position timing signals, each said cylinder position timing signal being characterized by the presence of a first logic level when a unique cylinder is within a first engine position angular range and, by the presence of a second logic level when said unique cylinder is within a second engine position angular range which does not include said first engine position angular range, said first engine angular position range corresponding to at least a portion of the power stroke of said unique cylinder, said engine angular position sensing means including:

1. a shaft rotating at a rate directly proportional to engine speed;

2. a disk coaxially disposed with respect to said shaft and rotating therewith, said disk having a plurality of radially distributed circular bands, each said band characterized by circumferentially arranged alternating opaque sectors and translucent sectors;

3. a plurality of light sensors;

4. at least one light source spaced from and directed toward said light sensors; and

5. means fixing the positions of each said light sensor and said at least one light source with respect to one another and with respect to said disk such that each said band of said disk extends into the space between said at least one light source and one of said light sensors thereby alternating blocking and passing light from said at least one light source to said one light sensor as said shutter assembly rotates with said shaft;

(C) a plurality of triggerable sources of intermittent high voltage pulses, each said triggerable source having an output delivering a single high voltage pulse each time it is triggered, each said triggerable source comprising an ignition coil, each said ignition coil including a low voltage primary winding and a high voltage secondary winding;

(D) a plurality of trigger signal developing means having an input and an output, each said trigger signal developing means output being connected to one of said triggerable sources and adapted to trigger said one triggerable source in response to the transition of a signal between logic "low" and logic "high" appearing at said input to said trigger signal developing means, each said trigger signal developing means including an electronic switch disposed in series with said primary winding of one of said ignition coils and a d-c electrical power source such that, when said electronic switch is closed, current from said power source passes through said primary winding of said one ignition coil to generate a magnetic field and when said electronic switch is opened, the magnetic field collapses to induce a high voltage pulse in said secondary winding of said one ignition coil;

(E) a plurality of gating means, each said gating means having:

1. an output coupled to said input of one of said triggerable signal developing means;

2. a first input coupled to receive one of said cylinder position timing signals; and

3. a second input coupled to receive pulses from said free running source; each said gating means being responsive to the presence of said first logic level in said cylinder position timing signal coupled thereto to pass said pulses from said free running source to said input of said one trigger signal development means coupled thereto and to the presence of said second logic level in said cylinder position timing signal coupled thereto to prevent said pulses from said free running source from being applied to said input of said one trigger signal development means coupled thereto; and

(F) means for transferring a high voltage pulse generated by the one of said triggerable sources coupled to said one trigger signal developing means to a spark plug in said unique cylinder to be fired when said engine angular position sensing means senses that the instantaneous engine angular position falls within said first angular range for said unique cylinder.

4,686,954

HIGH PERFORMANCE DIGITAL IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES

Craig R. Brown, Phoenix, Ariz., assignor to Stanley L. Dembecki, Phoenix, Ariz.

Filed Apr. 11, 1986, Ser. No. 850,594

Int. Cl.[4] F02P *1/00*

U.S. Cl. 123—607 **4 Claims**

1. A spark ignition system for an internal combustion engine comprising:

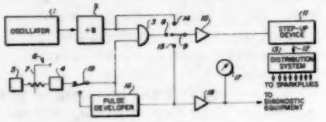
(A) a free running source of pulses which periodically switch between logic "high" and logic "low" levels;

(B) engine angular position sensing means for generating an engine timing signal characterized by the presence of a first logic level when the engine angular position is within a first angular range and by the presence of a second logic level when the engine angular position is within a second angular range which does not include said first angular range said first enqine angular position corresponding to at least a portion of an engine cylinder power stroke;

(C) a triggerable source of intermittent high voltage pulses, said triggerable source having an output delivering a single high voltage pulse each time it is triggered;

(D) trigger signal developing means having an input and an output, said trigger signal developing means output being connected to said triggerable source and adapted to trigger said triggerable source in response to the transition of a signal between logic "low" and logic "high" appearing at said input to said trigger signal developing means;

(E)-gating means responsive to the presence of said first logic level in said timing signal to pass said pulses from said free running source to said input of said trigger signal



developing means and to the presence of said second logic level in said engine timing signal to prevent said pulses from said free running source from being applied to said input of said trigger signal developing means;

(F) high voltage distribution means for transferring a hiqh voltage pulse generated by said triggerable source to a spark plug in the cylinder to be fired when said engine angular position sensing means senses that the instantaneous engine angular position falls within said first angular range; and

(G) alternative operation means for selectively enabling a service mode of operation, in which said service mode of operation a single triggering pulse is coupled to said triggerable source each time said first logic level is present, said alternative operation means comprising:

1. a pulse developer adapted to issue said single triggering pulse in response to each concurrence of:

a. said first logic level; and

b. the presence of the first pulse issued by said source of pulses occurring after said first logic level is present.

4,686,955

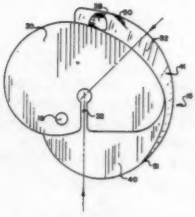
COMPOUND ARCHERY BOWS

Marlow W. Larson, Ogden, Utah, assignor to Browning Arms Company, Morgan, Utah

Continuation-in-part of Ser. No. 236,781, Feb. 23, 1981. This application Nov. 29, 1984, Ser. No. 676,740

Int. Cl.[4] F41B *5/00*

U.S. Cl. 124—23 R **11 Claims**



1. In an archery bow that includes resilient limbs which are deflected from their brace position to drawn position by the operation of a bowstring interconnected to the limbs through rigging including eccentric members which provide a varying cam ratio and tension runs opposite the bowstring with respect to the eccentrics, an improved rigging which comprises:

an eccentric member, with structure constituting means for providing pivotal connection of said eccentric about an axis, in operable association with a resilient limb, said eccentric member including:

a first, bowstring-engaging track with a plane of intersection transverse and approximately normal said axis constituting means for storing a portion of a bowstring when the bow limb is in its braced position and for paying out a portion of the bowstring as the bowstring is pulled to pivot the eccentric, thereby to deflect said limb, and

a second, tension run-engaging track, including a braced groove of relatively large radius, a drawn groove of relatively small radius, and a ramp surface connecting said braced and drawn grooves so that as the bowstring is pulled from braced to drawn position, the tangent point of contact of said tension run with said eccentric migrates from said braced groove over towards said bowstring-engaging track to said drawn groove, constituting means for taking up and storing a portion of a tension run as said bowstring is pulled to pivot the eccentric,

said first and second tracks being configured so that the cam ratio provided by said eccentric in operation increases more rapidly during the initial stage of draw than does the cam ratio in a circular eccentric with parallel tracks corresponding to said first and second tracks.

4,686,956

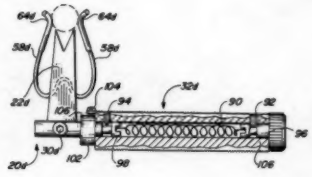
REST DEVICE

Fernando Troncoso, Jr., 14090 6100 Rd., Montrose, Colo. 81401

Filed Apr. 7, 1986, Ser. No. 848,628

Int. Cl.[4] F41D *10/00*

U.S. Cl. 124—41 A **9 Claims**



1. An improved archery arrow rest device, said device comprising, in combination:

a. a generally narrow, spring biased resiliently depressible launcher adapted to support only the lower portion of an arrow shaft;

b. a generally transverse launcher support arm receiving the rear end of said launcher, said support arm including a non-rotatable portion and a rotatable portion joined thereto and an internally coiled spring connected to both said portions, said launcher being connected to said rotatable portion for rotation therewith against the bias of said spring;

c. a spaced pair of flexible, resilient, bendable, generally upwardly and forwardly extending arrow-gripping arms secured to at least one of said launcher and said transverse support arm and disposed adjacent to and on opposite sides of said launcher, said arrow-gripping arms extending above said launcher forward end, and adapted to releasably grip opposite sides of an arrow shaft while it is on said launcher so as to prevent inadvertent roll-off of said shaft

from said launcher, said arrow-gripping arms obviating the necessity of a plunger, and,

d. arrow rest mounting means comprising a generally rearwardly extending mounting block releasably secured to said transverse support arm and adapted to be releasably secured to the sidewall of the riser section of an archery bow defining the window in said bow so as to support said launcher and said arrow-gripping arms in said window spaced laterally from said sidewall.

3. An improved archery arrow rest device, said device comprising, in combination:

a. a generally narrow launcher adapted to support only the lower portion of an arrow shaft;

b. a generally transverse launcher support arm receiving the rear end of said launcher;

c. a spaced pair of flexible, resilient, bendable, generally upwardly and forwardly extending arrow-gripping arms secured to at least one of said launcher and said transverse support arm and disposed adjacent to and on opposite sides of said launcher, said arrow-gripping arms extending above said launcher so as to prevent inadvertent roll-off of said shaft from said launcher, said arrow-gripping arms obviating the necessity of a plunger, and,

d. arrow rest mounting means comprising a generally rearwardly extending mounting block releasably secured to said transverse support arm and adapted to be releasably secured to the sidewall of the riser section of an archery bow defining the window in said bow so as to support said launcher and said arrow-gripping arms in said window spaced laterally from said sidewall, said transverse support arm extending through and being laterally adjustable and releasably securable to said block to adjustably position said launcher in said window, said transverse support arm being connected to a wheel rotatably secured to said block for incrementally advancing said transverse arm transversely.

4,686,957

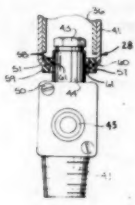
GAS NOZZLE ATTACHMENT

Walter Koziol, Antioch, Ill., assignor to Modern Home Products Corp., Antioch, Ill.

Continuation-in-part of Ser. No. 666,334, Oct. 30, 1984, abandoned. This application Jan. 28, 1986, Ser. No. 823,314

Int. Cl.[4] F24C *3/04*

U.S. Cl. 126—41 R **13 Claims**



1. An attachment member to provide an attachment between a gas nozzle and a venturi member and air regulator member assembly in a gas barbecue grill, the venturi member having at least one lateral aperture and the air regulator member operatively associated with the venturi member to control the entry of air, the assembly also having an opening for receiving the gas nozzle member, the attachment member comprising:

retaining means operatively associated with said venturi member and air regulator member assembly to provide linear attachment and linear release between said assembly and said nozzle member with ready release of said assembly from said gas nozzle member, said retaining means including a grommet of resilient material, an end portion of said venturi member or said air regulator member being attached to said grommet in a frictional manner and an inner portion of said grommet having means for releasingly engaging said nozzle.

4,686,958

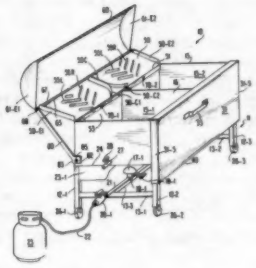
VERSATILE OUTDOOR COOKER

Maynard A. Skelton, and Delores J. Skelton, both of 1624 W. Clara Dr., Petersburg, Va. 23803

Filed Dec. 16, 1985, Ser. No. 808,986

Int. Cl.[4] F24D *1/00*

U.S. Cl. 126—369.2 **16 Claims**



1. In an outdoor gas cooker having a rectangular metal cooking tank for holding a cooking liquid to be heated by a gas flame from a gas burner mounted beneath said cooking tank to bottom surface of said metal cooking tank, the improvement comprising,

a cooked food drain plate having an edge secured at a predetermined angle, to the rear, upper edge of said tank so that cooking liquid from cooked food on said cooked food drain plate drains into said metal cooking tank, said predetermined angle being relatively shallow so as to avoid food sliding into said cooking tank while on said drain tray, including brace means for said cooked food drain plate,

a domed cover for minimizing heat loss from cooked food on said cooked food drain plate and preventing access to cooked food by insects, grass, dirt, leaves, etc. while on said cooked food drain plate, means hingably connecting said dome shaped cover to the edge of said cooked food drain plate remote from the said edge thereof which is secured to the said rear upper edge of said cooking tank, and

a cooking tank cover, said cooking tank cover being constituted by a flat metal plate having an area complementary to the cross-sectional area of said cooking tank so as to close off the top of said cooking tank while food is being cooked therein, a handle on the upper surface of said flat metal plate, and at least one depending flange depending from one edge of said flat metal plate so that said one depending flange can serve as a hook to hang the said cooking tank cover from the front upper edge of said cooking tank while the cook is inspecting food being cooked.

4,686,959

THERMAL STORAGE FURNACE SYSTEM

Clarence L. Marksberry, Plymouth, Minn., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Aug. 2, 1984, Ser. No. 638,191

Int. Cl.[4] F24H *7/00*

U.S. Cl. 126—400 **4 Claims**

1. A thermal storage furnace system for heating the interior volume of a structure or housing by means of circulating a heated fluid, comprising:

(a) a heating means for heating a fluid;

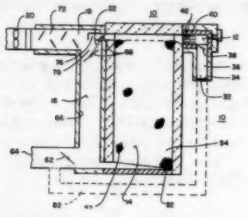
(b) a thermal storage means disposed in fluid communication with said heating means for transferring heat from said heated fluid and storing said transferred heat, and for transferring said stored heat to an unheated fluid;

(c) a thermal storage means bypass conduit disposed in fluid communication with a source of unheated fluid for bypassing unheated fluid past said thermal storage means; and

(d) a mixing means in fluid communication with said thermal storage means and said thermal storage means bypass conduit for mixing said heated fluid from said thermal storage means with said unheated fluid from said thermal storage means bypass conduit to provide for storage of heat in said thermal storage means at a first predetermined higher temperature than desired for heating the interior of said structure while providing a second predetermined temperature fluid for heating the interior of said structure;

(e) a fluid directing means disposed in said thermal storage means bypass conduit for directing heated fluid through said thermal storage means in a first predetermined direction during the charging phase when heat is being transferred into said thermal storage means and in the opposite director during the discharging phase when heat is being transferred out of said thermal storage means to provide optimum counterflow effects within said thermal storage means;

(f) said mixing means includes a directed heated fluid discharge means disposed in fluid communication with said thermal storage means and said thermal storage means



bypass conduit for directing said heated fluid stored at said first predetermined high temperature within said thermal storage means in a third predetermined direction into the fluid flowing in a fourth direction within said thermal storage means bypass conduit to augment mixing of said heated and unheated fluid, said directed heated fluid discharge means being located to discharge said heated fluid immediately upstream of a turn within said mixing means to further augment fluid mixing;

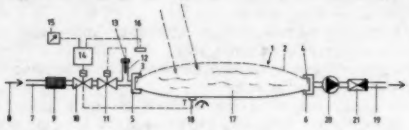
said thermal storage means having first and second ends, said first end being in fluid communication with said mixing means and said heating means and said second end being in fluid communication with the thermal storage means bypass conduit to provide for routing said heated fluid from said heating means through said first end, then said second end of said thermal storage means and into said thermal storage means bypass conduit to provide for mixing said heated fluid exiting said second end of said thermal storage means with said unheated fluid within said thermal storage means bypass conduit to provide for heating said thermal storage means to said first predetermined higher temperature, while providing a second predetermined temperature fluid for heating the interior of the structure by combining said heated fluid exiting said second end of said thermal storage means with said unheated fluid from said thermal storage means bypass conduit and delivering said combined heated and unheated fluids to said mixing means for mixing said heated and unheated fluids.

4,686,960

APPARATUS FOR HEATING WATER BY SOLAR ENERGY

Jürgen Kleinwächter, Kandern, Fed. Rep. of Germany, assignor to Bomin Solar GmbH & Co. KG, Lörrach, Fed. Rep. of Germany

Filed Nov. 29, 1985, Ser. No. 803,306
Int. Cl.[4] F24J 3/02
U.S. Cl. 126—422 **15 Claims**



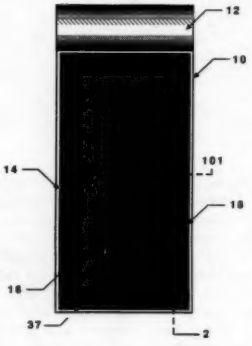
1. An apparatus for heating water by solar energy, including a container, having a top and a bottom, for the water to be supplied to consumers, made from a film or sheet of plastic, having a cold water inlet opening and an electromagnetically actuable first inlet valve upstream of said cold water inlet opening and having a withdrawal opening, wherein the top of the container is transparent and the bottom is dark in color, the withdrawal opening being upstream from a pump and a check valve, a sensor for measuring the instantaneous water temperature and an adjusting device for adjusting the desired temperature of the water to be supplied each being connected to the inlet valve, the first inlet valve admitting more water into the container the higher the instantaneous water temperature is, wherein a ventilation hose extended in a sealing manner to the outside is disposed in the container, an opening of a free end of the ventilation hose being connected to a float in such a way that said opening of said ventilation hose rests somewhat above the surface of the water in the container.

4,686,961

INTEGRATED SOLAR THERMAL ENERGY COLLECTOR SYSTEM

John D. Garrison, 5607 Yerba Anita Dr., San Diego, Calif. 92115, assignor to John D. Garrison, San Diego, Calif.

Continuation-in-part of Ser. No. 794,010, Nov. 1, 1985, abandoned, and Ser. No. 702,401, Feb. 15, 1985, abandoned. This application Nov. 22, 1985, Ser. No. 800,658
Int. Cl.[4] F24J 3/02
U.S. Cl. 126—433 **18 Claims**



1. A solar thermal collector system, one of a class of devices which converts solar radiation into heat and transmits this heat to storage from whence it is utilized, comprising:

an evacuated glass solar collector, the evacuated glass solar

collector having a glass vacuum envelope, the upper portion of the glass vacuum envelope also serving as window to pass solar radiation, the evacuated glass solar collector having a multiplicity of substantially parallel linear adjacent concentrating troughs, each trough shaped and mirror surfaced so as concentrate solar radiation in the vacuum, the mirror surface inside the vacuum and the concentration approximately ideal, the multiplicity of substantially parallel linear adjacent troughs extending substantially over the entire length and width of the evacuated glass solar collector, the upper portion of the glass vacuum envelope joined to the lower portion of the glass vacuum envelope between each trough substantially along the entire length of each trough, the upper portion of the glass vacuum envelope joined to the lower portion to the glass vacuum envelope around the outer perimeter of the evacuated glass solar collector so as to provide a glass vacuum seal, the evacuated glass solar collector having a multiplicity of glass absorbing tubes, each glass absorbing tube coated with selective absorber, each glass absorbing tube positioned in vacuum in corresponding substantially parallel linear adjacent trough, and extending substantially along the entire length of the trough, so as to receive the concentrated solar radiation, each glass absorbing tube having one end closed inside the vacuum near one end of the corresponding trough, each glass absorbing tube having glass vacuum seal at the other end near the opposing end of the corresponding substantially parallel linear adjacent trough, each glass absorbing tube having means of heat pipe removal of the collected heat through the glass vacuum sealed end, the glass of the evacuated glass solar collector being like glass;

a heat storage system, the heat storage system adjacent to the evacuated glass solar collector, the heat storage system having a heat storage tank which is thermally insulated, the heat storage tank containing a heat storage medium, and the heat storage system including means of removal of heat from the heat storage tank for utilization; a tubular heat pipe system, the tubular heat pipe system having an evaporator portion, the evaporator portion comprising primarily of a multiplicity of substantially parallel linear adjacent tube members, the evaporator portion inside the glass vacuum envelope so as to receive the heat from the concentrated solar radiation with the substantially parallel linear adjacent tube members in each corresponding substantially parallel linear adjacent trough and extending substantially over the entire length of each trough, the tubular heat pipe system having an adiabatic portion, the adiabatic portion proceeding directly from the evaporator portion to exit from the part of the glass vacuum envelope closest to the heat storage tank, the tubular heat pipe system having a condenser portion, the adiabatic portion proceeding directly from the glass vacuum envelope to the condenser portion, the condenser portion having means of efficient transfer of heat to the heat storage tank and heat storage medium, the tubular heat pipe system suitable for passing vapors from the evaporator portion to the condenser portion, and return of condensed vapors from the condenser portion to the evaporator portion, but substantially limiting the passing of condensed vapors from the evaporator portion to the condenser portion; and with

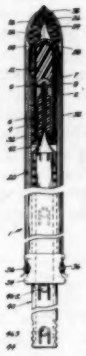
the solar thermal collector system having means of limiting the maximum temperature reached by the heat storage tank.

4,686,962

DISPOSABLE CARTRIDGE ASSEMBLY FOR HYPODERMICALLY IMPLANTING A GENITOURINARY PROSTHESIS

Terry M. Haber, Lake Forest, Calif., assignor to Habley Medical Technology Corporation, Laguna Hills, Calif.

Filed Jul. 3, 1986, Ser. No. 882,086
Int. Cl.[4] A61B *19/00*
U.S. Cl. 128—1 R **19 Claims**



1. An assembly for hypodermically implanting a genitourinary prosthesis for the treatment of urinary incontinence, said assembly comprising:

outer tube means having a cutting end for penetrating the urethral tissues of a patient undergoing treatment, said cutting end including a non-coring cutting nose disposed in a normally closed position across said outer tube means;

said genitourinary prosthesis comprising an inflatable containment membrane located within said outer tube means behind the cutting end thereof; and

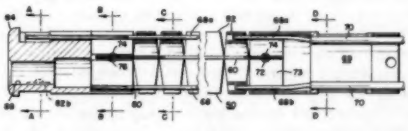
inner tube means located within and slidable through said outer tube means for opening said cutting nose, said inner tube means having a hypodermic needle at one end thereof and means for advancing said inner tube means through said outer tube for placing said hypodermic needle in communication with the interior of said containment membrane and for moving said containment membrane outwardly from the cutting end of said outer tube means, said containment membrane being percutaneously infused with and inflated by a supply of material by way of said hypodermic needle to increase local tissue volume and occlusive pressure applied to the urethra for returning the patient to continence.

4,686,963

TORSION RESISTANT VERTEBRATED PROBE OF SIMPLE CONSTRUCTION

Jack Cohen, Norwalk, and John L. Wardle, Wilton, both of Conn., assignors to Circon Corporation, Santa Barbara, Calif.

Filed Mar. 5, 1986, Ser. No. 836,434
Int. Cl.[4] A61B *1/00*
U.S. Cl. 128—4 **27 Claims**



1. A torsion resistant vertebrae assembly having a base end

member at one end thereof and an articulating end member on an opposite end thereof, said articulating end member having means to control the position thereof relative to said base end member, said vertebrae assembly comprising:

a plurality of individual vertebrae adjacent one another, each of said vertebrae adapted to articulate to its adjacent one;

control means for repositioning said articulating end member relative to said base end member, said control means being attached to said articulating end member and being activated on said base end member end of said assembly;

holding means for holding said base end member together with said articulating end member and said plurality of individual vertebrae disposed therebetween, said individual vertebrae operable to articulate one on another as controlled by said control means; and

resilient stiffening means disposed along said individual vertebrae in a manner in which said vertebrae are moveably coupled with said stiffening means whereby as said articulating end member of said assembly is articulated by said control means, said stiffening means provides torsion resistant controlled repositioning of said articulating end member.

4,686,964

ENDOSCOPE PICKUP MEANS

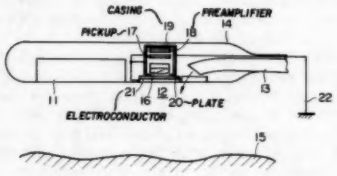
Yutaka Yunoki, Kunitachi, and Tatsuo Nagasaki, Musashino, both of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 559,112, Dec. 7, 1983, abandoned. This application Feb. 18, 1986, Ser. No. 830,248

Claims priority, application Japan, Dec. 7, 1982, 57-214229

Int. Cl.[4] A61B *1/04, 1/06*

U.S. Cl. 128—4 **8 Claims**



1. An endoscope optical pickup means comprising: a tip probe insertable into an object to be examined, endoscope optical image pickup means disposed in a detector end of said tip probe for providing an optical image of the interior of an object to be examined and for photoelectrically converting said optical image, said endoscope optical image pickup means being installed in an electromagnetic shield casing in said detector end of said tip probe and provided with optically transparent electromagnetic shield means installed in front of said optical image pickup means and across an optical axis of said endoscopic optical image pickup means, said electromagnetic shield casing and said optically transparent electromagnetic shield means being electrically connected with each other, said electromagnetic shield casing and said optically transparent electromagnetic shielding means being connected to a ground potential for shielding said endoscopic optical image pickup means from external electromagnetic noise, said optically transparent electromagnetic shield means comprising a light transmitting member and an optically transparent electroconductive member laminated to said light transmitting member for shielding said optical image pickup means from external electromagnetic noise with respect to said optical axis of said endoscope optical image pickup means.

4,686,965

INSTRUMENT FOR ENDOSCOPIC OPERATIONS

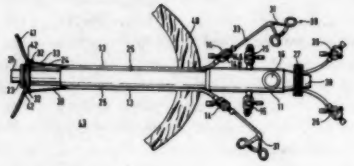
Ludwig Bonnet, and Siegfried Hiltebrandt, both of Knittlingen, Fed. Rep. of Germany, assignors to Richard Wolf GmbH, Fed. Rep. of Germany

Filed Jan. 31, 1986, Ser. No. 824,662

Claims priority, application Fed. Rep. of Germany, Feb. 8, 1985, 3504292

Int. Cl.[4] A61B *1/00*

U.S. Cl. 128—4 **9 Claims**



1. An instrument for endoscopic treatment of internal body organs including the gall bladder comprising a tubular trocar sleeve having an inner diameter, a proximal end and an axial length terminating in a distal end, said trocar sleeve having at least one instrument channel extending axially of the sleeve, said instrument channel having a diameter smaller than the inner diameter of the sleeve, a flexible forceps device having proximal and distal ends separated by a flexible intermediate portion dimensioned to be received through said instrument channel and having a length greater than the instrument channel, said flexible forceps device having a pair of grasping forceps jaws at a distal end thereof and a means for activating the grasping forceps jaws at a proximal end thereof, said sleeve having clamping means carried thereby for fixing the position of the flexible forceps with respect to the instrument channel whereby the flexible forceps are locked in position with respect to the sleeve, said sleeve having an operating length dimensioned to substantially bridge the distance between the abdominal wall and the organ to be treated of a patient after insufflation with the proximal end of the sleeve exterior of the abdominal wall, a trocar sleeve insert having a portion extending from a distal end which has a minimum outer dimension sized to be received axially within the sleeve inner diameter whereby the insert can be pushed into the sleeve proximal end and project out of the distal end of the sleeve, said insert having a working channel therethrough, and said portion having an axial length dimensioned to bridge the distance between the abdominal wall and the organ after insufflation whereby the insert distal end can be inserted into the organ with the distal end of the insert projecting beyond the distal end of the sleeve, said insert portion having an axial length greater than the axial length of the sleeve, said insert having sealing means adjacent its proximal end, said sealing means including a first sealing member adapted to engage against an inside wall of the organ and a second sealing member axially spaced of the first sealing member proximally thereof adapted to sealingly engage and outside of the gall bladder wall.

4,686,966

DISPOSABLE DUCKBILL SPECULUM

Joy Y. Tsai, No. 54, Lane 1, Been Street, Tung Shih, Taichung Hsien, Taiwan

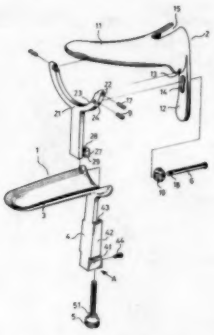
Continuation-in-part of Ser. No. 832,431, Feb. 24, 1986. This application Apr. 11, 1986, Ser. No. 850,853

Int. Cl.[4] A61B *1/30*

U.S. Cl. 128—17 **1 Claim**

1. A disposable gynecologic duckbill speculum made of plastics or fiber-reinforced plastics for examining the vagina comprising a lower bill section, an upper bill section, a support column and connecting pieces connecting said lower bill section, upper bill section and support column together, said lower bill section comprising a lower bill and a stationary

handle in a manner of both said lower bill and said stationary handle being produced as one piece, said lower bill having a duckbill shape with a rounder tip and perpendicularly connecting the tip of said stationary handle with the center of the rim, said stationary handle looking like an L-shape column having two guide walls, together with two flanges on its tip, set on the intermediate area and having a hole set on the lower protrudent portion and also a hole set horizontally penetrating it through the circumference of said protrudent portion, said upper bill section comprising a duckbill-like upper bill with a round tip and an adjustable handle wherein said upper bill and said adjustable handle being produced as one piece, wherein said upper bill has two connection holes set around two ends on the rim, and the right rim of said upper bill connects the tip



of said adjustable handle and thereby forms an appropriate angle, an elliptic adjustment hole being set on the intermediate area in said adjustable handle, aforementioned connecting pieces comprising a bolt being all threaded, an adjustment nut, two bill fasteners, one bolt fastener, a fixing screw and a height adjustment bolt, said fixing screw securing said height adjustment bolt to said lower bill section after said height adjustment bolt having connected said support column with said lower bill section, and said height adjustment bolt enabling said support column to be screwed up and be kept to a desired width, said bill fasteners securing said upper bill section to said support column, said bolt fastener securing the bolt to said support column, and said adjustment nut enabling said duckbill speculum to be adjusted and be kept to a desired opening angle.

4,686,967

ROCKING MASSAGE CHAIR

Koichi Hashimoto, Sakata; Haruo Sugai, Hikone; Hikoyoshi Hara, Shijonawate, and Norio Yamada, Hikone, all of Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed Nov. 20, 1985, Ser. No. 799,979

Claims priority, application Japan, Dec. 19, 1984, 59-269300

Int. Cl.[4] A61H *15/00*

U.S. Cl. 128—57 **8 Claims**

1. A rocking massage chair comprising:

a rocking chair body including integral seating and backrest parts, and a rocking base having a flat bottom part disposed below said seating part and an arcuate bottom part extending upwardly from a rear end of said flat bottom part;

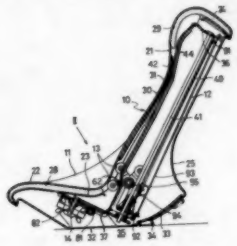
at least one pair of horizontally spaced, rotary massaging wheel elements housed within said backrest part of said chair body to be vertically displaceable for providing a massaging action along the back of a user sitting on the chair; and

a drive mechanism for vertically displacing said massaging wheel elements, said drive mechanism comprising:

a rotatable threaded drive shaft housed in said backrest part and extending substantially between upper and lower ends of said backrest part,

a drive motor housed in said seating part forwardly of said drive shaft and having an output shaft coupled to a lower end of said drive shaft for axially rotating said drive shaft,

a guide rail disposed in said backrest part forwardly of said drive shaft and extending substantially parallel to said drive shaft, said guide rail positioned between said pair of



massaging wheel elements and including a wall which is curved in general conformance to the shape of a user's back as viewed in side elevation, and

shifting means coupled to said massaging wheel elements and to said driveshaft for being moved vertically along said curved wall of said guide rail in response to rotation of said drive shaft to displace said massaging wheel elements vertically.

4,686,968

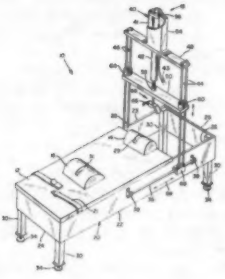
METHOD AND APPARATUS FOR RESTORING CURVATURE TO THE SPINE

John S. Scherger, 702 W. Clark, Pasco, Wash. 99301

Continuation-in-part of Ser. No. 758,264, Jul. 24, 1985. This application Jul. 22, 1986, Ser. No. 888,480

Int. Cl.[4] A61F *5/04*

U.S. Cl. 128—72 **8 Claims**



1. An apparatus for inducing curvature in a human spine, comprising:

a table for supporting the body in an unrestrained position;

spinal support means of a shape corresponding substantially to a concavity of the spine for providing a fulcrum to the unrestrained body to enable portions of the body to extend and flex, the spinal support means being mounted on the table; and

a force applicator mounted for longitudinal movement along the table, the applicator having means that extend and press against a portion of the body to be flexed and that will be withdrawn and moved longitudinally of the body as the body flexes in an arc and presses against the applicator whereby the applicator resists yet accommodates both

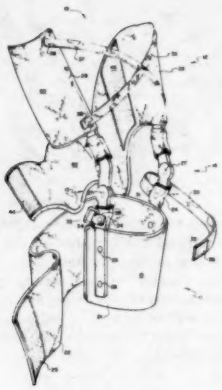
the longitudinal and perpendicular components of the arcuate path of the flexing body.

4,686,969

KNEE BRACE HAVING UPPER CUFF WITH CROSSED STRAPS

Edwin R. Scott, 927 South 450 East, Orem, Utah 84057

Filed Jan. 13, 1986, Ser. No. 818,230
Int. Cl.[4] A61F 3/00
U.S. Cl. 128—80 C **6 Claims**



1. A knee brace comprising

a lower cuff having a rigid shell molded to fit snugly on the anterior lower leg of a user and strap means extending fully around the shell and the lower leg, said strap means being adapted to rigidly connect the shell to the lower leg of a user;

an upper cuff including a pair of crossing, flexible, fabric non-resilient straps and spaced upper extension arms comprising components of hinges, and second strap means attached to one of the upper extension arms and adapted to extend around the upper leg of a user and over the crossed straps; and

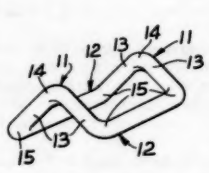
hinges including the upper extension arms, interconnecting the lower and upper cuffs, said hinges including lower extension arms rigidly connected to opposite sides of the shell.

4,686,970

DEVICES FOR SPINAL FIXATION

John Dove, Stone, and Anthony D. Showell, Belbroughton, both of England, assignors to A. W. Showell (Surgicraft) Limited, Belbroughton, England

Filed Dec. 14, 1984, Ser. No. 681,937
Int. Cl.[4] A61F 5/04
U.S. Cl. 128—92 YM **7 Claims**



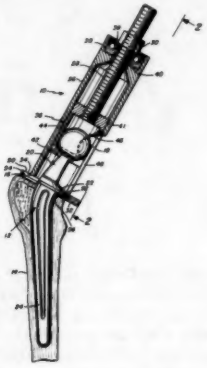
1. A device for spinal fixation comprising a rod of biocompatible material formed into a substantially continuous rigid rectangle having integral shorter and longer sides connected together at corners, said shorter sides being bent and extending in the same direction as each other substantially transverse to a plane containing said longer sides, the bending of said shorter sides enabling the receipt of the spine within the device so that said longer sides fit in contact with the spine thereby allowing said rectangle to be secured to the spine by wires with those wires looped around the shorter sides of said rectangle being automatically guided down said shorter sides to rest at the corners connecting said shorter sides with said longer sides.

4,686,971

METHOD AND APPARATUS FOR EXTRACTION OF PROSTHESES

William H. Harris, 655 Concord Ave., Belmont, Mass. 02178, and Dennis W. Burke, 24 Marine Rd., South Boston, Mass. 02127

Filed Nov. 19, 1984, Ser. No. 673,131
Int. Cl.[4] A61F 5/04
U.S. Cl. 128—92 VT **13 Claims**



1. Apparatus for extracting the stemmed component of a prosthesis from a bone in which it is implanted, said apparatus comprising:

a housing having a first end and a bearing surface disposed at a second thereof spaced from said first end, said bearing surface being adapted to bear against a proximal end of the bone surrounding the prosthesis;

a shaft slidably and nonrotatably disposed with respect to said housing, said shaft having a first end disposed within said housing;

means disposed on said first end of said shaft for grasping the stemmed component; and

means threadably coupled to said shaft and adapted to be rotated with respect to said shaft for axially moving said shaft with respect to said second end of said housing and for applying a continuous, controlled force to the stemmed component directed away from the proximal end of the bone generally in the direction of elongation of the component to pull the component away from the bone when the component is grasped by said grasping means.

4,686,972

SURGICAL DEFLECTOR AND DRILLING GUIDE

Kenneth Z. Kurland, 2 W. McCabe Rd., El Centro, Calif. 92243

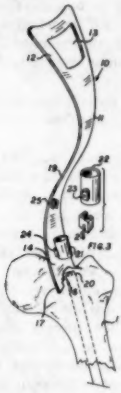
Filed Apr. 30, 1986, Ser. No. 857,341
Int. Cl.[4] A61F 5/04
U.S. Cl. 128—92 V **3 Claims**

1. A surgical deflector and boring tool positioner to facilitate access to a patient's internal tissue which comprises:

a generally S-shaped, ribbon-like main body;

the upper part of said body expanding into a generally tri-

angular handle, and the lower part defining a positioning foot having a concavely arcuate end dimensioned to ride above the head of the patient's femur; and



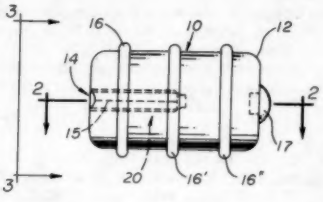
means for guiding a boring tool into the boney tissue, wherein said means for guiding including a sleeve mounted above said arcuate end and axially directed toward the boney tissue.

4,686,973

METHOD OF MAKING AN INTRAMEDULLARY BONE PLUG AND BONE PLUG MADE THEREBY

Eldon E. Frisch, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Oct. 12, 1984, Ser. No. 659,976
Int. Cl.[4] A61F *5/04*
U.S. Cl. 128—92 YZ **22 Claims**



11. An inflatable intramedullary bone canal plug for plugging an open-ended intramedullary canal of a bone comprising a plug produced by a method which comprises the steps of:

(I) forming a hollow expandable container of a biocompatible elastomeric material having (a) a first container wall side having a configuration which forms a hollow interior region within said plug for receiving a pressurizing amount of a biocompatible fluid and has an elongated member of elastomeric material affixed to said first wall side at one end of the container and (b) a second container wall side opposite and part of the same container wall as is the first wall side having a configuration which is adapted to be received within said canal, said container having an opening situated opposite said elongated member which extends completely through said first and second container wall sides, said opening being at least substantially as wide as the width of the elongated member and no larger than the width of the container at the region where the opening is located,

(II) forming a channel extending completely through the center of said member and through said wall sides, said channel being sealingly engageable with a cooperating injection means,

(III) placing a shrinkable elastomeric band of a biocompatible elastomeric material over said elongated member, said band having an inner configuration which is larger than the outer configuration of said member before shrinking and in its shrunken state is sufficiently smaller than the outside configuration of the elongated member so as to compress the elongated member and the channel running therethrough in a sealing fashion,

(IV) shrinking the elastomeric band over the elongated member to form a resealable valve assembly for receiving said injection means, and

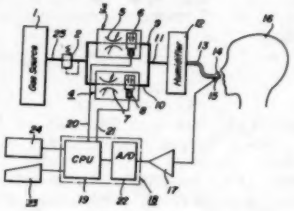
(V) sealing said opening with an endcapping means, wherein said container wall has a sufficient strength and thickness to contain pressure from injection of said biocompatible fluid into the hollow interior region of said container and wherein said container further contains a means for the controlled release of injected fluid to reduce the pressure within said interior region of a pressurizing amount of said fluid.

4,686,974

BREATH SYNCHRONIZED GAS-INSUFFLATION DEVICE AND METHOD THEREFOR

Toru Sato; Naoto Okazaki; Toshihisa Hasegawa, all of Yonago; Katsumasa Fujii, and Kazukiyo Takano, both Okayama, all of Japan, assignors to Tottori University, Tottori, Japan

Filed Sep. 2, 1986, Ser. No. 904,021
Claims priority, application Japan, Oct. 18, 1985, 60-231059
Int. Cl.[4] A61M *16/00*
U.S. Cl. 128—204.23 **5 Claims**



1. A breath-synchronized gas-insufflation device, comprising a gas source, a valve means connected to the gas source so as to regulate flow rate and duration of gas flow from the gas source, an insufflating means connected to the valve means so as to insufflate the gas therefrom toward a respiratory system of a living body, a sensor exposed to respiration of the living body and producing electric signals which distinctively indicate inspiratory phase and expiratory phase of the respiration, and an operational controller receiving the electric signals from the sensor and producing such control signals to the valve means that gas insufflation starts before beginning of the inspiratory phase and ends before termination of the inspiratory phase while providing a short pulse-like peak flow of a large amount of the gas in an early stage of the inspiratory phase.

4,686,975

ELECTRONIC RESPIRABLE GAS DELIVERY DEVICE

Errol J. Naimon, Hopkins, and Michael Jackson, Brooklyn Park, both of Minn., assignors to Applied Membrane Technology, Inc., Minnetonka, Minn.

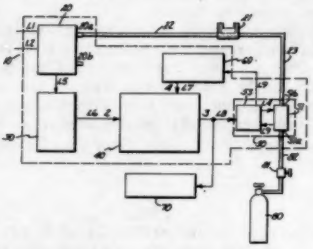
Filed May 3, 1985, Ser. No. 730,432
Int. Cl.[4] A61M *16/00*
U.S. Cl. 128—204.23 **9 Claims**

1. A supplemental respiratory device that delivering a respirable gas to a user, on a demand basis, which comprises:

(a) pressure sensing means for sensing changes in airway pressure, relative to atmospheric pressure, caused by the user's inspiration, and for producing a variable first electrical signal proportional in strength to the intensity of the pressure differential;

(b) inspiration detection means, responsive to the first electrical signal for producing a second signal when said first signal passes a settable threshold;

(c) electronic variable timing means, for initiating a timing cycle in response to the second signal, and for producing a third electrical signal for the duration of the timing cycle;



(d) an inspiration frequency detection means receiving the third electrical signal and from the frequency thereof producing a fourth electrical signal, said fourth electrical signal communicated to the electronic variable timing means for controlling the duration of said third electrical signal such that the frequency and duration of the third electrical signal are inversely proportional to each other;

(e) respirable gas delivery means responsive to the third electrical signal allowing the gas to flow to the user only so long as the delivery means is receiving the third electrical signal.

4,686,976

SAFETY MASK

Charles A. Bakkila, 7839 Salem Rd., Northville, Mich. 48167, and Frederick P. Warrick, 18207 132nd Ave., Sun City West, Ariz. 85375

Continuation of Ser. No. 675,879, Nov. 28, 1984, abandoned. This application Dec. 27, 1985, Ser. No. 815,120

Int. Cl.[4] A62B *7/10*

U.S. Cl. 128—206.15 **4 Claims**

1. In a safety mask comprising a mask body adapted to be placed over the nose and mouth and having means for holding the mask body over the nose and mouth wherein the mask body has an inlet valve, first threaded receptacle means associated with and overlying said inlet valve, a vapor solvent filter having an outlet and an inlet and threads at the outlet, said first receptacle means for threadedly receiving the vapor solvent filter therein and for providing fluid communication between said outlet and said inlet valve, said vapor filter having an annular bead on the periphery thereof surrounding the inlet, the improvement comprising

an imperforate cap telescoped over the inlet of said vapor filter and snapped onto the annular bead of said vapor filter,

said cap including a base wall and a peripheral wall extending from said base wall,

means interengaging the cap and filter and providing a seal between the cap and filter including a row of circumferentially extending ribs on the inner surface of the peripheral wall of said cap which engage said bead on the periphery of the vapor filter,

said peripheral wall having a radial opening therethrough,

a valve adapted to be attached to the belt or clothing of the wearer,

said valve having an inlet adapted to be connected to a source of air and a first outlet and a second outlet fluidically communicating with said inlet with means for connection to a paint spray gun,

said mask further including a second inlet valve, second threaded receptacle means associated with and overlying said second inlet valve, a second vapor filter having an outlet and an inlet and threads at the outlet, said second receptacle means for threadedly receiving the second vapor solvent filter therein and for providing fluid comunication between the outlet of said second vapor filter and said second inlet valve, said second vapor filter having annular bead on the periphery thereof surrounding the inlet of said second vapor filter,

a second imperforate cap telescoped over the inlet of said second vapor filter and snapped onto the annular bead of said second vapor filter,

said cap including a base wall and a peripheral wall extending from said base wall, a radial opening through the peripheral wall,

means interengaging said second cap and said second filter and providing a seal between said second cap and said second filter including a row of circumferentially extending ribs on the inner surface of the peripheral wall which engage the bead on the second filter, and means for fluidically interconnecting the radial opening of said second cap to said valve and said radial opening of said first cap comprising a T connection having three openings, tubes connecting each of two openings to the radial openings of said first and second imperforate caps, an air line connecting the first outlet of the valve with the third opening of the T connection, and

said valve including means for varying the amount of air passing from the inlet through said first outlet to the mask.

4,686,977

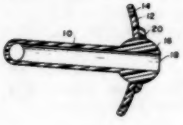
TRACHEAL CANNULA

Frank Cosma, 15022 Alexandria St., San Leandro, Calif. 94579

Filed Apr. 3, 1986, Ser. No. 847,678

Int. Cl.[4] A61M *16/00*

U.S. Cl. 128—207.17 **2 Claims**



1. A tracheal cannula comprising:

an arcuate cannula tube having a first end for entering the trachea of a patient and a second end extending outward from the throat area of the patient;

a throat plate coupled to the second end of said cannula tube and securable to said throat area, the second end of said cannula tube being formed with a spherical ball and wherein said throat plate is formed with a ball socket

engaging said spherical ball whereby the coupling between said throat plate and said second end permits rotation of said cannula tube and free horizontal and vertical pivoting thereof with respect to said throat plate.

4,686,978

INSTRUMENTATION FOR IMPLANTATION OF AN ELBOW PROSTHESIS

Thomas G. Wadsworth, 22 Hyde Park Square, London, W.2, England

Continuation of Ser. No. 139,700, Apr. 14, 1980, abandoned, which is a division of Ser. No. 931,319, Aug. 7, 1978, abandoned. This application Aug. 21, 1981, Ser. No. 294,889
Int. Cl.[4] A61B *17/00*
U.S. Cl. 128—303 R 2 Claims

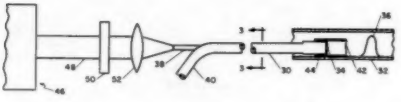
1. Instrumentation for implantation of an elbow prosthesis comprising a humeral component having an articular surface that is curved concave in a coronal plane and curved convex in a sagittal plane and an ulnar component having an articular surface that is curved convex in the coronal plane and curved concave in the sagittal plane and is complementary to said articular surface of said humeral component, said instrumentation comprising a humeral impactor including an impactor head comprised of a thin curved end member of which a pushing surface is formed complementarily to said articular surface of said humeral component, and a stem extending from one end of said end member in a direction substantially perpendicularly away from said pushing surface, whereby said end member extends unilaterally from said stem.

4,686,979

EXCIMER LASER PHOTOTHERAPY FOR THE DISSOLUTION OF ABNORMAL GROWTH

Dieter M. Gruen, Downers Grove; Charles E. Young, Westmont, and Michael J. Pellin, Naperville, all of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Continuation-in-part of Ser. No. 569,088, Jan. 9, 1984, abandoned. This application Feb. 19, 1985, Ser. No. 702,569
Int. Cl.[4] A61B *17/36*
U.S. Cl. 128—303.1 15 Claims



1. A method of severing a human tissue comprising the steps of

providing a laser-transmitting member composed of glass,

exposing at least a portion of the tissue to the laser transmitting member, and

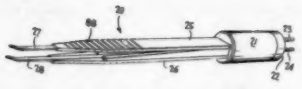
directing a laser having a wavelength of about 290–400 through the laser transmitting member to the tissue portion for a time and at an intensity level sufficient to penetrate the tissue and separate a tissue portion from remaining tissue.

4,686,980

DISPOSABLE BIPOLAR INSTRUMENT

Rodger W. Williams, and Larry J. Morgan, both of Nashville, Tenn., assignors to Alcon Laboratories, Inc., Fort Worth, Tex.

Filed Apr. 17, 1986, Ser. No. 853,150
Int. Cl.[4] A61B *17/39*
U.S. Cl. 128—303.13 8 Claims



1. A disposable bipolar instrument for ophthalmic surgery comprising:

a first shell half having a proximal end and a distal end; a second shell half having a proximal end and a distal end; and a means for connecting said first and said second shell halves at respective proximal ends thereof so that they can function as forceps; said means for connecting including a support portion for maintaining said respective proximal ends in substantially fixed relative relationship, so that said first and second shell halves are cantilevered thereabout; said proximal ends being spaced apart a predetermined distance when no manual force is being applied to said first and second shell halves; said first shell half including a first pair of upstanding wall-like projections; said second shell half including a second pair of upstanding wall-like projections; said first pair of upstanding wall-like projections being in sliding engagement with said second pair of upstanding wall-like projections during manual flexure of said first and second shell halves; said first pair of upstanding wall-like projections being guided, during flexure of said first shell half toward said second shell half, by said second pair of upstanding wall-like projections; said first pair of wall-like projections including a sloped region; and said second pair of wall-like projections including a sloped region; said sloped regions of said first pair of wall-like projections and said second pair of wall-like projections being disposed such that the respective said distal ends of said first and second shell halves can be urged manually toward each other by resilient bending flexure of said first and second shell halves in cantilevered bending; said resilient bending flexure causing a progressive increase in resistive force to further flexure, thereby providing tactile feedback to an operator during manual operation of said first and second shell halves;

a first electrode carried by said first shell half; a second electrode carried by said second shell half;

a connector means for connecting said first and second electrodes to a voltage source; said first and second electrodes projecting beyond said respective distal ends for simultaneous use as forcep tips and as operational electrodes during ophthalmic surgery;

whereby said first electrode and said second electrode can be guided toward and away from one another by manual urging of said first and second shell halves.

4,686,981

SURGICAL INSTRUMENT ESPECIALLY FOR PERFORMING NEUROSURGICAL OPERATIONS

László Forintos, Amerikai ut 57, 1145 Budapest, Hungary

PCT No. PCT/HU84/00020, § 371 Date Nov. 26, 1984, § 102(e) Date Nov. 26, 1984, PCT Pub. No. WO84/03829, PCT Pub. Date Oct. 11, 1984

PCT Filed Mar. 28, 1984, Ser. No. 684,333

Claims priority, application Hungary, Mar. 28, 1983, 1037/83

Int. Cl.[4] A61B *17/39*

U.S. Cl. 128—303.17 10 Claims

1. In a surgical instrument for performing neurosurgical operations, having a flexible suction tube connectable to a vacuum source, the suction tube being provided with a finger plate having a hole communicating with an inner space of the suction tube, the suction tube further being provided with an electric connector connectable to a high-frequency power source, and an end which localizes a field energized by said source, a portion of said suction tube reaching the locality of said field, the tube end functioning as a coagulating end, the suction tube with the tube end being provided on its outer surface with an electrically insulating, flexible plastic coating, said tube end being exposed, the improvement wherein the suction tube is formed by a flexible silver pipe which has been heat treated to permit bending during a surgical procedure by the surgeon, and said coating is made of a polyamide synthetic thermoplastic polyamide-11 material hot-melt bonded to the heat treated flexible silver pipe and produced by condensation of 11-amino-undecane carboxylic acid to a thermoplastic of the formula

$$H[HN-(CH_2)_{10}-CO]_nOH$$

based on castor oil.

4,686,982

SPIRAL WIRE BEARING FOR ROTATING WIRE DRIVE CATHETER

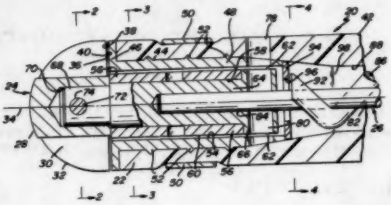
John Nash, 145 Oak St., Downingtown, Pa. 19335

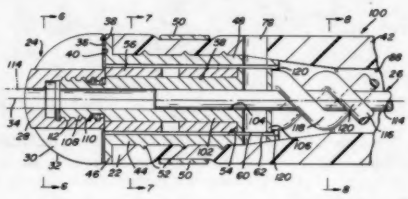
Filed Jun. 19, 1985, Ser. No. 746,220

Int. Cl.[4] A61F *17/32*

U.S. Cl. 128—305 32 Claims

1. A catheter for introduction into a lumen in a living being to effect a procedure therein, said catheter being an elongated tubular flexible member having a distal end at which a working head is located, said catheter having an inner surface defining a passageway extending down said catheter, said working head being arranged for movement with respect to a central axis extending through said passageway, elongated drive means for said working head located within said passageway and extending down said catheter from a point adjacent said working head to a first remote proximal location, and an elongated bearing means for said drive means, said bearing means also located within said passageway and extending down said catheter from a point adjacent said working head to a second remote proximal location, one of said two last mentioned means being formed of at least a first wire and the other of said last two mentioned means being formed of a spiral of at least a second wire wrapped about said first wire, said second wire forming a helical space between its convolutions, whereupon said catheter can be readily bent through any arc up to a minimum radius of curvature while said drive means is rotated freely with respect to said bearing means and to said catheter at a high rotational speed to effect the movement of said working head with respect to said axis, said bearing means and said drive means cooperating with each other to maintain said drive means at a substantially neutral position within said catheter when said catheter is bent through said arc and rotated at said high rotational speed without resulting in undue vibration which could interfere with said procedure, said helical space





being in communication with said inner surface and through which a cooling fluid may flow to contact said inner surface of said catheter and said first and second wires to expedite the rotation of said drive means with respect to said bearing means.

4,686,983

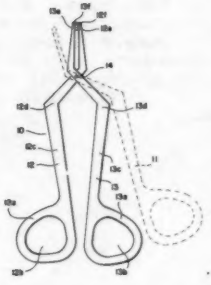
APPARATUS AND METHOD FOR LIGATING A BODY VESSEL

Gerald Leisman, 130-12 - 229th St., Laurelton, N.Y. 11413, and A. Zeev Hed, 12 Wagon Trail Dr., Nashua, N.H. 03062

Filed Apr. 8, 1986, Ser. No. 849,570

Int. Cl.[4] A61B *17/12*

U.S. Cl. 128—325 32 Claims



1. A disposable ligating apparatus to ligate a body vessel comprising:

an applicator having as portions thereof first and second elongated members each having a handle portion, a jaw portion, means to connect the portions of said first and second elongated members so that the jaw portions may be closed together and then spread;

a ligating clip assembly comprising as separate members a first and second clip member, each clip member having a body portion and means on each body portion to interlock

said clip member with the other clip member upon clamping the clip members together;

retaining cavity means integral with each jaw portion to retain one of said clip members in said jaw portion prior to closing said jaw portion, which retaining cavity means is opened releasing the clip member upon closing said jaw portions;

flexible retaining legs on opposite sides of each of said cavity means, said legs being positioned opposite corresponding legs on the other jaw portion, the said legs upon closing of the jaw portions being spread apart releasing said clip members from said jaw portions by deformational opening of said retaining cavity means, said jaw portions on closure interlocking together said clip members, said jaw portions then being opened leaving said clip members closed and clamped on said vessel.

4,686,984

CATHETER FOR WIDENING A PUNCTURE CHANNEL

Ludwig Bonnet, Knittlingen, Fed. Rep. of Germany, assignor to Richard Wolf GmbH, Fed. Rep. of Germany

Filed Mar. 12, 1985, Ser. No. 710,717

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1984, 8407894[U]

Int. Cl.⁴ A61M *25/00*

U.S. Cl. 128—343 **8 Claims**

1. A catheter for widening a puncture channel in a kidney, comprising an elongated body with a tapered end, a second end and a central passage extending between the second end and the tapered end, said body having an additional guiding passage extending between the tapered end and the second end parallel to said central passage for receiving a guide wire.

4,686,985

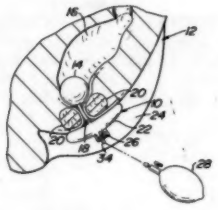
ANAL DILATOR AND OCCLUDER

Edward A. Lottick, 789 Wyoming Ave., Kingston, Pa. 18704

Continuation-in-part of Ser. No. 734,294, May 15, 1985. This application Apr. 24, 1986, Ser. No. 853,680

Int. Cl.⁴ A61M *29/02*

U.S. Cl. 128—344 **3 Claims**



1. Apparatus for partial insertion into the anus, comprising:

an inflatable element which comprises a tubular shape having a proximal end and a closed distal end and a plurality of chambers when inflated;

said plurality of chambers comprising when said element is inserted into the anus and inflated a first chamber extending proximally from the closed distal end of substantially spherical shape adapted to be positioned within the rectum, a second chamber of a substantially elongated shape which is adapted to be positioned within the orifice of the anal sphincter muscles, and a third chamber comprising a transverse elongated shaped chamber adapted when inflated to lie outside of the body between the buttocks:

said first chamber including a convoluted entrance such that inflation of said first chamber to a predetermined degree causes a closing off of said convoluted entrance.

an inflation stem at said proximal end of said inflatable element for inflating said chambers; and

valve means to said inflation stem for retaining or releasing the inflating fluid in said device.

4,686,986

METHOD AND APPARATUS FOR PROMOTING HEALING

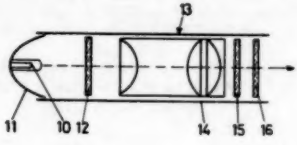
Marta Fenyö, H-1094 Tompa u. 12.; Iván Kertész, H-1121 Költo u. 2-4; Károly Rózsa, H-1115 Szakasits Áu. 44B, and Péter Szegö, H-1022 Hankóczy J.u. 27/A, all of, Budapest, Hungary

Filed Apr. 26, 1982, Ser. No. 371,954

Claims priority, application Hungary, Sep. 2, 1981, 2538/81; Feb. 23, 1982, 04016/82

Int. Cl.⁴ A61N *5/00*

U.S. Cl. 128—396 **21 Claims**



1. Method for in vivo stimulation of biological processes relating to cellular activity in a region of cells, comprising the step of irradiating the in vivo region to be stimulated with light of predetermined intensity, said light being linearly polarized and non-coherent and predominantly including wavelength components exceeding 300 nm and substantially excluding ultraviolet components and non-polarized infrared components.

4,686,987

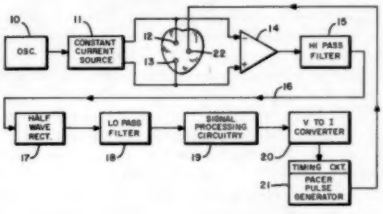
BIOMEDICAL METHOD AND APPARATUS FOR CONTROLLING THE ADMINISTRATION OF THERAPY TO A PATIENT IN RESPONSE TO CHANGES IN PHYSIOLOGIC DEMAND

Rodney W. Salo, Columbia Heights, and Brian D. Pederson, St. Paul, both of Minn., assignors to Cardiac Pacemakers, Inc., St. Paul, Minn.

Continuation-in-part of Ser. No. 274,875, Jun. 18, 1981, abandoned. This application Mar. 29, 1982, Ser. No. 362,903

Int. Cl.⁴ A61N *1/36*

U.S. Cl. 128—419 PG **14 Claims**



1. Apparatus for applying therapy to a patient based upon the hemodynamic state of said patient's body, comprising in combination:

(a) intracardiac ventricular impedance sensing means for

sensing the stroke volume in only one ventricular chamber of the heart;

(b) means coupled to said sensing means for developing a control signal varying as a function of changes in said stroke volume;

(c) patient therapy means having controllable rate means for establishing the rate at which prescribed therapy is administered to the patient; and

(d) means for applying said control signals to said controllable rate means to change said rate in relation to said changes in stroke volume.

4,686,988

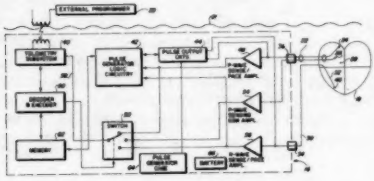
PACEMAKER SYSTEM AND METHOD FOR MEASURING AND MONITORING CARDIAC ACTIVITY AND FOR DETERMINING AND MAINTAINING CAPTURE

Jason A. Sholder, 21037 Cantara St., Canoga Park, Calif. 91304

Filed Oct. 19, 1984, Ser. No. 662,723

Int. Cl.[4] A61N *1/36*

U.S. Cl. 128—419 PT **42 Claims**



1. A system for determining atrial capture comprising:

heart pacing means for generating stimulation pulses;

electrically conductive lead means including

a first electrically conductive electrode connected to said heart pacing means, and

a second electrically conductive electrode spaced apart from said first electrode; and

means for sensing atrial capture of said stimulation pulses, said atrial capture sensing means including

a first amplifier connected to receive signals sensed by said first electrode, said first amplifier including first receiving means for receiving only those signals indicative of a naturally occurring or intrinsic atrial P-wave, said first amplifier further having means for generating a first output signal in response to the receipt of a signal by said first receiving means,

a second amplifier connected to receive signals sensed by said second electrode, said second amplifier including second receiving means for receiving signals indicative of any atrial P-wave sensed by said second electrode, said second amplifier further having means for generating a second output signal indicative of the sensing of at least a P-wave that occurs in response to a stimulation pulse applied to said first electrode by said heart pacing means, and

means responsive to the absence of the first output signal and the presence of said second output signal and said heart pacing means for determining whether atrial capture has occurred.

4,686,989

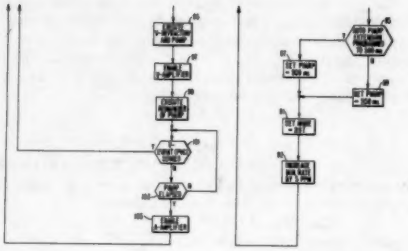
METHOD OF OPERATING PACEMAKER FOR DETECTING PACEMAKER-MEDIATED TACHYCARDIA

Nicholas P. D. Smyth, 5316 Portsmouth Rd., Spring Hill, Bethesda, Md. 20816, and Bernard J. Stevens, Carrolltown, Pa., assignors to Nicholas P. D. Smyth, Washington, D.C.

Filed May 16, 1985, Ser. No. 734,842

Int. Cl.[4] A61N *1/36*

U.S. Cl. 128—419 PG **13 Claims**



1. The method of operating a cardiac pacemaker while said pacemaker is in a host, said pacemaker having leads connected to the atrium and to the ventricle and having means for controlling the supply of pulses through said leads to said atrium and ventricle, said method being practiced while said pacemaker is in use in said host and comprising: normally operating said pacemaker in the DDD mode, automatically monitoring the operation of said pacemaker for the occurrence of pacer-mediated tachycardia, namely the repeated stimulation, as the result of retrograde conduction from the ventricle to the atrium, of an atrial event by a ventricular event a predetermined time interval after said ventricular event, said atrial stimulation being detected by said pacemaker causing said pacemaker to stimulate said ventricle after an atrio-ventricular delay, causing the just described cycle to repeat itself, on the detection of the presence of pacer-mediated tachycardia, automatically setting the post-ventricular atrial refractory period of the pacemaker at a magnitude greater than said predetermined time interval after the occurrence of a pulse in the ventricle, and latching said post-ventricular atrial refractory period of the pacemaker in at said magnitude during the continued operation of said pacemaker so that it can be changed only be external reprogramming to suppress pacer-mediated tachycardia during the continued operation following said setting.

4,686,990

BATTERY TEST CIRCUIT FOR A HEART PACEMAKER

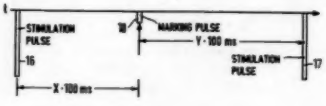
Lennart Moberg, Spanga, Sweden, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 17, 1986, Ser. No. 908,213

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1985, 3535181

Int. Cl.[4] A61N *1/02, 1/36*

U.S. Cl. 128—419 PT **4 Claims**



1. A battery test circuit for a heart pacemaker which generates a plurality of successive stimulation pulses comprising:

means for generating an electrical signal corresponding to the charge status of the battery;

means for generating at least one marking pulse; and

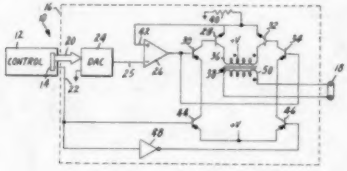
means for mixing said marking pulse with said stimulation pulses with the marking pulse disposed at a chronological position with respect to at least one of said stimulation pulses which corresponds to said charge status.

4,686,991

ELECTRICAL STIMULATOR FOR BIOLOGICAL TISSUE UTILIZING LINEAR CURRENT OUTPUT CIRCUIT

Joel R. Dufresne, and Alan P. Dieken, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jun. 17, 1985, Ser. No. 745,212
Int. Cl.[4] A61N 1/36
U.S. Cl. 128—421 **10 Claims**



1. A linear current output circuit for a biological tissue stimulator receiving a digital output word and for driving said biological tissue which provides a load for said circuit, comprising:

a linear digital-to-analog converter for receiving said output word;

an operational amplifier coupled to said digital-to-analog converter, said operational amplifier having a noninverting input, an inverting input and an output, said inverting input being operatively coupled to said digital-to-analog converter;

compensation circuit means operatively coupled between said inverting input and said output of said operational amplifier for ensuring the high-frequency stability of said operational amplifier;

transistor network means operatively coupled to said output of said operational amplifier and adapted to be coupled to said load for providing current amplification to said output of said operational amplifier;

reference resistor means operatively coupled to said transistor network for having a voltage across said reference resistor means which is representative of the current being supplied to said load from said transistor network means; and

feedback path means coupled to said reference resistor means and to said non-inverting input of said operational amplifier for supplying said voltage across said reference resistor means to said operational amplifier.

4,686,992

OPHTHALMIC BEAM DIRECTOR

David A. Dewey, Huntington Beach, and Paul C. Pynckel, Santa Ana, both of Calif., assignors to CooperVision, Inc., Palo Alto, Calif.

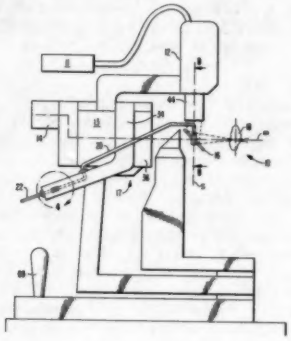
Filed May 3, 1985, Ser. No. 729,985
Int. Cl.[4] A61B 17/36; G02B 7/18
U.S. Cl. 128—303.1 **15 Claims**

1. In an apparatus for micromanipulating a position of a light beam directed against a target of the type which includes a source of light and a beamsplitter for receiving light from said source and redirecting said light to said target, said beamsplitter being pivotable about an x-axis for vertically redirecting said light and rotatable about a y-axis for horizontally redirecting said light, means for manually micromanipulating said beamsplitter comprising;

a control member capable of movement in a direction having an x-component and a y-component;

a coiled spring coupled to said control member through a pivot location; and

a control rod coupled to said spring and to said beamsplitter to exert a torque on said beamsplitter to redirect said light



on said target in the same relative direction of movement as said control member, wherein the longitudinal axis of the control member, the longitudinal axis of said coiled spring, and the intersection of the pivotal and rotational axes of the beamsplitter lie on a straight line, when said control member is not manipulated.

4,686,993

LOW PROFILE FUNCTIONAL ORTHOTIC

Michael T. Grumbine, Whittier, Calif., assignor to Paragon Podiatry Laboratories, Whittier, Calif.

Filed Jul. 26, 1985, Ser. No. 759,221
Int. Cl.[4] A61F 5/14
U.S. Cl. 128—581 **7 Claims**

1. A low profile functional orthotic for supporting a patient's foot from a bottom plane defined by the upwardly facing surface of the insole of a shoe and comprising

a rigid unitary contoured supportive plastic shell formed with forefoot, arch and heel portions having respective downwardly facing forefoot, arch and heel plantar surfaces and formed on the top side with respective upwardly facing forefoot, arch and heel support surfaces cooperating together to form a contoured foot support surface, such arch portion being raised above said bottom plane to form such arch support surface elevated above said bottom plane, said forefoot support surface tapering continuously downwardly and forwardly from said arch support surface to intersect such bottom plane, such heel support surface tapering rearwardly and downwardly from such arch support surface and being dished out centrally to form raised lateral and medial walls cooperating to define therebetween a heel cup having a bottom wall formed with a thickness at its lower point of no more than 1/16th of an inch whereby such shell may be formed of plastic to form such foot support surface to afford the desired support for such foot and such forefoot and heel portions may then be ground off on their bottom sides to form said

forefoot and heel plantar surfaces for disposition in said bottom plane to thus afford positive foot support while presenting a low profile within such shoe.

4,686,994

REMOVABLE ARCH SUPPORT

George B. Harr, 744 Obispo Ave., Long Beach, Calif. 90804, and Ronald W. Smith, 3131 Lama Ave., Long Beach, Calif. 90808

Filed Apr. 6, 1984, Ser. No. 597,358
Int. Cl.[4] A43B 7/14
U.S. Cl. 128—586 12 Claims

1. An arch support device without any foot encircling band and which is designed for use as a removable shoe insert for treatment of temporary or chronic foot disorders including:

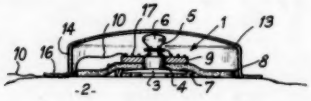
a unitary member truncated at its forward end to terminate posterior to the heads of the first and fifth metatarsals to leave the ball of the foot in contact with the shoe insole without any interference from the device and which is also truncated at its rearward end to terminate anterior to the plantar prominence of the calcaneus to leave the heel of the foot in contact with the shoe insole without any interference from the device, said unitary member being formed by a relatively thin layer of substantially rigid material which extends transversely from the medial side of the plantar surface of the foot continuously to the opposite lateral side of the plantar surface, and which includes a central arch means for holding both the longitudinal and transverse dimensions of the arch of the foot in a predetermined raised position relative to the ball and heel of the foot, with said central arch means cantilevered in a suspended position to form a bridge which is spaced above the shank portion of the shoe from support bases which directly contact the shoe insole, with said support bases located only along peripheral portions of said unitary member to eliminate the thick bulk of compressible cushion which usually fills the space between the plantar of the foot and the insole of the shoe, thereby preventing excessive pronation of the foot while transferring some of the body and leg weight through the peripheral support bases to the underlying shoe insole.

4,686,995

ELECTROCARDIOGRAM ELECTRODE APPARATUS

Jean-Francois Fournial, La Sauvagere, Route de Parinier, 72560 Change, and Gilles Ascher, 20bis, Boulevard du Général Leclerc, 92200 Neuilly-sur-Seine, both of France

Filed Feb. 11, 1986, Ser. No. 828,298
Int. Cl.[4] A61B 5/04
U.S. Cl. 128—640 4 Claims



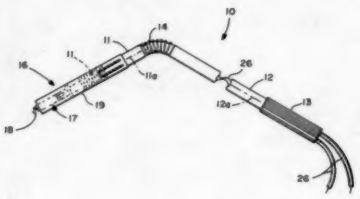
1. Electrode apparatus for use in taking electrocardiograms in an ambulatory mode, comprising a metal electrode member presenting an electrode disc and a stud projecting from said disc for connection with an electrical conductor, a flexible adhesive disc defining a central aperture positively fitting over said stud and presenting an adhesive-coated face by which said adhesive disc and electrode disc may be secured to the patient's skin, and a cover member for covering said electrode member, said adhesive disc and a part of said conductor, said cover member presenting a base portion, a side wall portion depending from said base portion and presenting a substantially planar edge, and a flange extending from said edge generally in the same plane as said edge when unstressed, said flange portion bearing a coating of contact adhesive on a face thereof opposite to said base, whereby said cover member may be secured to the patient's skin with said electrode member, said adhesive disc and said part of said conductor within it, said conductor being trapped between said adhesive coating and the patient's skin.

4,686,996

ELECTRODE ASSEMBLY FOR SENSING HEART ACTIVITY

Paul Ulbrich, 26602 Corporate Ave., Hayward, Calif. 94545

Continuation-in-part of Ser. No. 812,967, Dec. 24, 1985, abandoned. This application Aug. 1, 1986, Ser. No. 892,600
Int. Cl.[4] A61B 5/04
U.S. Cl. 128—642 12 Claims



1. An electrode assembly for sensing heart activity from body tissues comprising:

a cylindrical guide tube having a first relatively rigid portion having a first axis with a proximal end affixed to a fetal engaging electrode and a second relatively rigid portion having a second axis with a distal end having a rotatable handle for manually rotating said guide tube, said guide tube also including a relatively flexible intermediate portion connecting said first and second portions including universal joint means for aligning said first and second axes in a common plane but not necessarily coincident with each other;

sleeve means at said proximal end in which said guide tube is rotatable around the first axis of said first portion, said sleeve means being graspable, whereby when said handle is rotated and said sleeve means is grasped and the respective axes of said first and second cylindrical portions while coplanar are not coincident said universal joint means accommodates said rotation.

4,686,997

SKELETAL BONE REMODELING STUDIES USING GUIDED TREPHINE SAMPLE

Clarence M. Oloff, Dayton, Ohio; Linda M. Hermann, Feasterville, Pa.; William G. Moss, Enon, and Steven R. Sims, Dayton, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Division of Ser. No. 751,393, Jul. 3, 1985, Pat. No. 4,653,509. This application Nov. 13, 1986, Ser. No. 930,163
Int. Cl.[4] A61B 5/05
U.S. Cl. 128—653 22 Claims

1. An axial skeleton bone remodeling study method comprising the steps of:

mapping radiographically the spinal lumbar vertebral region of a living test subject using a plurality of angularly segregated radial radiographic views;

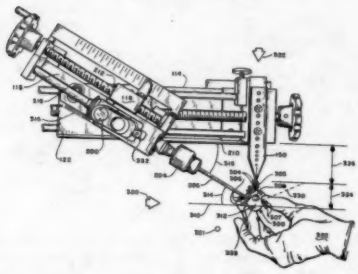
computing from said mapping the trigonometric accessing dimensions of a spinal process free spinal centrum diagonal path radial of a selected vertebra centrum within said lumbar region;

extracting from said process free centrum diagonal path a first mechanically guided full transverse trephine sample;

subjecting said test subject to a determined regimen of bone structure influencing test environment;

excising from a second process free spinal vertebra centrum

diagonal path a second mechanically guided full transverse trephine sample; and



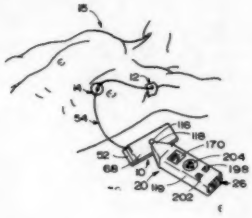
comparing said first and second full transverse trephine samples.

4,686,998

PATIENT TEMPERATURE AND HEARTBEAT RATE MONITORING SYSTEM

Adam Robbins, San Marcos, Calif., assignor to Mediscan Research Limited, Pasadena, Calif.

Filed Nov. 12, 1985, Ser. No. 797,164
Int. Cl.[4] A61B 5/02
U.S. Cl. 128—670 **12 Claims**



1. A patient temperature and heartbeat rate monitoring system comprising a plurality of transmitters one for each patient to be monitored, and a receiver,

wherein each transmitter is comprised of sensor means for sensing patient temperature and heartbeat rate and for providing an actual temperature input which has a voltage level proportional to actual patient temperature, a reference temperature input which has a voltage level proportional to a predetermined reference temperatre, and a heartbeat rate input which has a frequency corresponding to heartbeat rate, low pass filter means coupled to said sensor means and receiving said heartbeat rate input for isolating an electrical heartbeat signal having a frequency equal to heartbeat rate, phase lock loop means for receiving said heartbeat signal and for providing a harmonic heartrate signal at a phase controlled frequency which is an upper harmonic of said heartbeat signal, multiplexing means coupled to receive said actual temperature input and said reference temperature input from said sensor means and coupled to receive said heartrate signal from said phase lock loop means, voltage controlled oscillator means coupled to provide an input and receive an output from said multiplexing means, frequency dividing means connecting to receive an input from said voltage controlled oscillator means through said multiplexing means and to provide an output to said multiplexing means, whereby said actual temperature input and said reference temperature input are provided by said sensor means to said voltage controlled oscillator means through said multiplexing means to produce a voltage controlled output signal of frequency proportional to voltage level, and said voltage controlled output signal is provided as an input to said frequency dividing means in sequence with said heartrate signal through said multiplexing means, and said frequency dividing means produces clock and data signals to said multiplexing means of frequency proportional to and stepped down from that of the existing input to said frequency dividing means to sequentially gate each of said voltage level inputs through said multiplexing means to said voltage controlled oscillator means, and said clock and data signals are sequentially at a frequency proportional to voltage level of said reference temperature input, voltage level of said actual temperature input and frequency of said heartbeat rate input, and modulating means for transforming said clock and data signals of said dividing means into radio frequency signals,

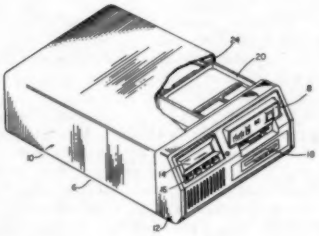
and wherein said receiver is comprised of demodulating means for sensing said radio frequency signals and for reproducing said clock and data signals, and signal processing means for producing a visual display from said reproduced clock and data signals.

4,686,999

MULTI-CHANNEL VENTILATION MONITOR AND METHOD

Leon T. Snyder; Frank A. Scarfone; James L. Reuss, all of Boca Raton; George V. Campen, Fort Lauderdale, and George H. Yates, Boca Raton, all of Fla., assignors to Tri Fund Research Corporation, Denver, Colo.

Filed Apr. 10, 1985, Ser. No. 753,069
Int. Cl.[4] A61B 5/08
U.S. Cl. 128—716 **14 Claims**



1. A multi-channel ventilation monitor for real-time monitoring of multiple physilogical activities associated with respiration of a monitored subject, involving comparison of a plurality of discrete data signals indicative of each such activity, said monitor comprising, in combination:

(a) a plurality of sensors for detection of discrete physiological activity indicative of breathing activity, each of said sensed physilogical activity being converted by a transducer to data signals which are characteristic of the sensed physiological activity;

(b) a plurality of discrete information processing channels for processing of the physiological data signal from each sensor, each such physiological data signals being processed in a separate channel;

(c) a signal processing means for each such channel for verifying the quality of each such signal;

(d) means for dynamic adjustment of the gain and frequency response for each of the sensed physiological activity to reflect trends in the data signal for each such physilogical activity;

(e) means for comparison of the wave form of each such signal to certain standards, including wave forms of a sensed physilogical activity which have been stored in a data base and wave forms of sensed physiological activity

which are indicative of a trend in a sensed activity for the monitored subject; and

(f) means for generation of an output signal to indicate abnormal physiological activity associated with respiration.

4,687,000

COMPOSITION AND SAMPLING RECEPTACLE METHOD FOR TREATING BLOOD WITH ANTICOAGULANT

Anne R. Eisenhardt, Birkerod, and Ole M. Hansen, Copenhagen, both of Denmark, assignors to Radiometer A/S, Copenhagen, Denmark

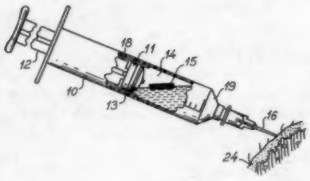
PCT No. PCT/DK84/00069, § 371 Date Mar. 15, 1985, § 102(e) Date Mar. 15, 1985, PCT Pub. No. WO85/00662, PCT Pub. Date Feb. 14, 1985

PCT Filed Jul. 13, 1984, Ser. No. 713,911

Claims priority, application Denmark, Jul. 15, 1983, 3261/83; Jun. 12, 1984, 2861/84

Int. Cl.[4] A61B *5/00*

U.S. Cl. 128—760 **24 Claims**



1. A blood sampling device comprising receptacle means defining a blood receiving space therein for receiving a blood sample, said means including

a blood inlet means for introducing a sample of whole blood into the blood receiving space,

an anticoagulant present within said space, the anticoagulant being an anticoagulant capable of binding cation ion species in blood, and

an additive present within said space and including several selected cation species which occur in blood, each species in the additive being present in an amount substantially corresponding to the binding capacity for that species that the anticoagulant exhibits when in equilibrium with a blood sample of substantially the same volume as that of said receptacle so as to ensure substantially the same concentration of each of the selected cation species in an unbound condition in the blood after the blood has been introduced into the blood receiving space as is in the blood prior to being introduced into said space.

4,687,001

SUBCUTANEOUS FLUID AND CULTURE CHAMBER AND IMPLANT TECHNIQUE

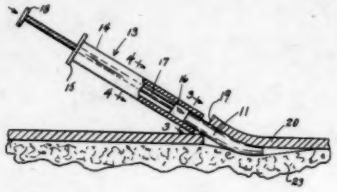
Robert J. Arko, Atlanta, Ga., assignor to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed Feb. 14, 1977, Ser. No. 768,397

Int. Cl.[4] A61B *10/00*

U.S. Cl. 128—767 **4 Claims**

1. Apparatus for establishing a subcutaneous culture chamber in a living body comprising a rigid elongated tubular sleeve member of flattened rectangular cross-section provided internally with slidable ejection plunger means fitted therein, and an elongated flexible flattened tubular member of inert resilient material of substantially uniform wall thickness normally of substantially hollow cylindrical shape and having two opposite open end portions and a plurality of relatively closely spaced apertures around its circumference at one of said end portions thereof comprising means to permit tissue encapsulation and to render said end portion substantially more yieldable than the intermediate portion of the flexible tubular member to facilitate subcutaneous insertion of the chamber and subsequent establishment of a fluid space in the adjacent body tissue, said inert resilient material being puncturable with a needle, said tubular



member being held confined in said sleeve member in a substantially flattened condition so as to be engageable through an incision in the skin layer of the living body when forced out of the sleeve member by said ejection plunger means.

4,687,002

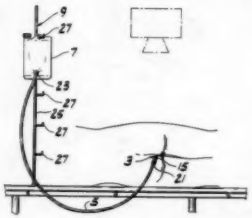
SPHINCTEROGRAM AND ANAL EXERCISING DEVICE

Christopher J. Lahr, 57 Concord Dr., Fairview Heights, Ill. 62208

Filed Mar. 6, 1986, Ser. No. 836,729

Int. Cl.[4] A61B *5/10*

U.S. Cl. 128—774 **5 Claims**



1. A sphincterogram device for use with radiographic equipment and the like and which measures a patient's anal canal length, anal canal pressure, anorectal angle, fatigability of the anal musculature and the like, comprising:

an elongated expandable balloon having an open end for conection to a fluid flow line and terminating in a closed distal end;

a tubular catheter disposed substantially within the balloon and secured to the distal end thereof and having a free open end thereof terminating within the balloon in communication with the interior of the balloon and a plurality of openings spaced along a substantial portion of its length for communicating between the interior of the balloon and the interior of the catheter, the catheter being sufficiently flexible to bend when inserted in the anal canal and having its free open end unimpeded by any external connection, such as a connection to a fluid conduit or flow line, for freedom of movement to conform substantially to the anal canal so that the anorectal angle may be measured;

at least one fluid supply reservoir;

at least one fluid flow line interconnecting the reservoir and the balloon for flow of fluid therebetween;

pressurizing means operable on the fluid supply reservoir for adjusting fluid pressure therein and for adjusting fluid pressure and volume in the catheter and balloon; and calibration means associated with the pressurizing means for determining fluid pressure within the balloon.

4,687,003

DENTAL DEVICE

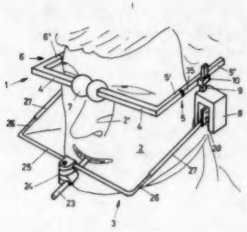
Rainer Burckhardt, Mühlweg 49, 8480 Weiden, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 554,177, Nov. 22, 1983, abandoned. This application May 5, 1986, Ser. No. 859,652

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1982, 8233294[U]

Int. Cl.[4] A61C *19/04, 9/00*

U.S. Cl. 128—777 **13 Claims**



1. A device for the three-dimensional measurement of the relative movement between a first body and a second body, comprising two measurement transmitters spaced apart from each other, each said transmitter having a first transmitter element and a second transmitter element which is movable to said first transmitter element, said first transmitter elements being fastened to the first body using first means and said second transmitter elements being fastened to the second body using second means, each said measurement transmitters providing two measurement paths with a first of said two measurement paths on each said measurement transmitter being used for the determination of relative movement between the first and the second transmitter elements in a first axis, and with a second of said two measurement paths of each said measurement transmitter being used for the determination of relative movement between the first and the second transmitter elements in a second axis which is perpendicular to the first axis, at least one of said two measurement transmitters having an additional third measurement path, said additional third measurement path on said at least one measurement transmitter being used for the determination of relative movement between the first and the second transmitter elements of said at least one measurement transmitter having said additional third measurement path in a third axis that is perpendicular to said first and second axes, each said measurement path on each said measurement transmitters comprising a light path on the corresponding second transmitter element, each said light path being formed by a source of light, a light detector arranged at a distance from the source of light, said source of light and said light detector being on the second transmitter element, said light detector being an optoelectronic element creating an electrical output signal in response to the quantity or intensity of light striking the light detector, and optical filters on the first transmitter elements and lying within the light path between the light source and the light detector; the optical filters of the first and second measurement path on each of said two measurement transmitters, each filter including a transmission wedge having a filter density which increases or decreases in the direction in which the relative movement between the first and the second transmitter elements is determined by the corresponding measurement path such that, upon relative movement between the first transmitter element and the second transmitter element of said measurement transmitters in the first and/or second axis, the output signals of said light detectors of the first measurement paths vary in response to said relative movement in the first axis and the output signals of the light detectors of the second measurement paths vary in response to said relative movement in the second axis, respectively; the optical filter of the third measurement path on said at least one measurement transmitter being a dispersion screen such that, upon relative movement between the first transmitter element and the second transmitter element of said measurement transmitter having said third measurement path in the third axis, the output signal of the light detector of the third measurement path varies in response to said relative movement in the third axis; the optical filters on each first transmitter element lying in a common plane, and all light paths on each second transmitter element being parallel to each other.

4,687,004

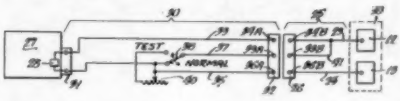
DUAL ELEMENT ELECTRICAL CONNECTOR

Ilias R. Zenkich, Norridge, Ill., assignor to Zenex Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 754,887, Dec. 27, 1976, abandoned. This application Nov. 30, 1977, Ser. No. 855,952

Int. Cl.[4] A61N *1/04*

U.S. Cl. 128—798 **7 Claims**



1. An improved cable and connection circuit for connecting an electrical treatment apparatus to a dual element electrical connector adapted for a body contact and having a first and second electrode, said electrical treatment apparatus having means for sensing whether the electrical conductivity of said cable and connection circuit is high or low, said cable and connection circuit comprising:

a cable;

a connection circuit which includes,

a first jack having a first, a second and a third terminal,

a first conductor electrically connected to said first terminal and adapted for electrical connection to said first electrode,

a second conductor electrically connected to said third terminal and adapted for electrical connection to said second electrode,

a jumper conductor electrically connected to said first and second terminals; and

means for connecting the cable to the electrical treatment apparatus and to the connection circuit.

5. In an electrical treatment apparatus for detecting or analyzing electrical signals from the body of a patient or for applying electrical signals to the body, an improved cable, connection circuit, and dual element electrical connector for body contact, comprising:

a dual element electrical connector having

a base of nonconductive flexible material;

a first electrode secured to said base;

a second electrode secured to said base and spaced from said first electrode;

a cover of flexible nonconductive material having an aperture and secured to said base, said electrodes being exposed through said cover aperture;

a sponge pad secured to each of said electrodes for body contact; and a conductive gel impregnating said sponge pad;

a connection circuit having

a first conductor electrically connected to said first electrode;

a second conductor electrically connected to said second electrode; and

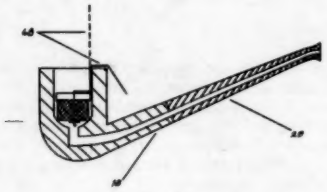
a first jack electrically connected to said first and second conductors;

a cable for electrically connecting the electrical treatment apparatus to the connection circuit having

a second jack adapted to be electrically connected to the electrical treatment apparatus;

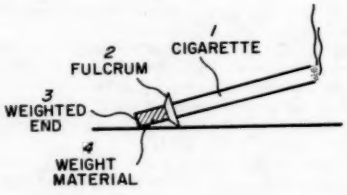
a third jack mated with said first jack;
conductor means coupled between said second and third jacks for electrically connecting said first and second conductors to said electrical treatment apparatus;
a switch;
means responsive to said switch and coupled through said first and second jacks for providing a short circuit between said first and second conductors when said first jack is mated with said third jack and said switch is in one position; and
means responsive to said switch and coupled through said first and second jacks for providing an adjustable resistance between said first and second conductors when said first jack is mated with said third jack and said switch is in another position.

4,687,005
PIPE BOWL FILTER
Harry C. Moore, 1743-F Pinetree N., Columbus, Ohio 43229
Filed Nov. 7, 1985, Ser. No. 785,225
Int. Cl.[4] A24F *3/02, 5/08*
U.S. Cl. 131—202 **1 Claim**



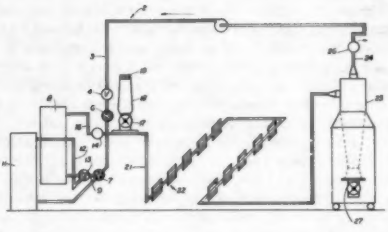
1. A tobacco pipe comprising a bowl, stem, mouthpiece, and a filter inserted in said bowl so that any tobacco inserted into said bowl to be smoked would be in substantially direct contact with said filter; said filter being substantially cylindrical in shape and having a perforated foil cap on top of said filter; said filter having a pull wire extending throughout the entire length of said filter; said wire extending (a) through the bottom of said filter being secured at said bottom by a wire plate and (b) through the top of the filter; said extension through the top having length so that it can extend beyond the top of the bowl so that said filter can be retrieved by the user.

4,687,006
CIGARETTE FIRE SAFETY APPARATUS
Jay W. Shelton, Rt. 7, Box 124JK, Santa Fe, N. Mex. 87501
Filed May 20, 1985, Ser. No. 736,070
Int. Cl.[4] A24F *13/16*
U.S. Cl. 131—257 **8 Claims**



8. An apparatus for reducing the danger of fire from lighted cylindrical smoking materials such as cigarettes and cigars, which comprises in combination:
a. a fulcrum which is an integral part of the cylindrical smoking material and divides the cylindrical smoking material into two segments, one segment being designated the mouthpiece segments does not readily support combustion, said fulcrum being located along a circumference of the outer surface of the cylindrical smoking material and extending outward substantially radially therefrom, said fulcurm further lying substantially flat against the outer surface of the cylindrical smoking material when the cylindrical smoking material is packaged, and automatically deploying to substantially the optimal size thereof upon removal of the cylindrical smoking material from the package; and
b. weight, comprising distributed mass, located inside of the mouthpiece segment of the cylindrical smoking material such that said weight, in cooperation with said fulcrum, causes the cylindrical smoking material to tilt about said fulcrum when the cylindrical smoking material comes in contact with a substantially horizontal surface, whereby the burning end fo the lighted cylindrical smoking material is sufficiently raised from the surface to prevent ignition of the surface material, and whereby the rolling path of the cylindrical smoking material is signficantly limited.

4,687,007
PROCESS FOR DRYING AND EXPANDING TOBACCO
Robert F. Denier, Louisville, Ky., and Robert H. Marshall, New Albany, Ind., assignors to Brown & Williamson Tobacco Corporation, Louisville, Ky.
Filed Feb. 24, 1986, Ser. No. 832,300
Int. Cl.[4] A24B *3/12, 3/18*
U.S. Cl. 131—296 **19 Claims**



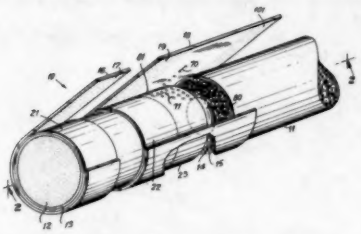
1. A process for drying tobacco comprising: introduction pressurized superheated steam into a restricted pressure and flow controllable system; controlling the pressure differential and velocity flow of said superheated steam across said system so that said steam is at a preselected velocity to entrain a preselected minimum pressure range of approximately 20–60 psig to improve the smoking quality and fill value of tobacco to be introduced into said system; introducing tobacco to be dryed through a first gas lock into said system to be entrained by said pressurized steam for a preselected residence time in said system; disentraining the tobacco from said residence time; and discharging the disentrained tobacco from said system through a second gas lock into a zone of lower pressure.

4,687,008
FILTER CIGARETTE
Willie G. Houck, Jr., Richmond; Francis M. Sprinkel, Jr., Glen Allen; Reginald W. Newsome, Richmond; David B. Spruill, Richmond, and Walter A. Nichols, Richmond, all of Va., assignors to Philip Morris Incorporated, New York, N.Y.
Filed Apr. 17, 1986, Ser. No. 853,049
Int. Cl.[4] A24D *3/04*
U.S. Cl. 131—335 **35 Claims**

1. A filter cigarette comprising:
a substantially cylindrical tobacco rod;
a substantially cylindrical filter plug, the tobacco rod and the filter plug having substantially the same cross-sectional area and shape;

tipping paper circumscribing said filter plug and a portion of said tobacco rod;

means associated with said filter plug for lengthening and shortening said cigarette, said lengthening and shortening



means being such as to retain said filter plug against removal from said cigarette; and

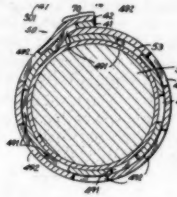
means for varying the air dilution value of said filter cigarette responsive of lengthening and shortening of said filter cigarette.

4,687,009

ADJUSTABLE FILTER CIGARETTE AND METHOD OF MANUFACTURE THEREOF

Walter A. Nichols, Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Filed Feb. 24, 1986, Ser. No. 832,234
Int. Cl.[4] A24D *3/04*
U.S. Cl. 131—336 **16 Claims**



1. A filter cigarette comprising:

a substantially cylindrical tobacco rod;

a substantially cylindrical filter plug having an air-permeable periphery and a mouth end and a rod end open to the passage of air and smoke, and comprising a mouth-end segment axially connected to a rod-end segment for rotation about the axis of the cigarette, each of said segments having respective mouth and rod ends and respective lengths; and

a tipping paper laminate circumscribing said filter plug and a portion of said tobacco rod; wherein:

said tipping paper laminate comprises an inner tipping paper layer, and an outer tipping paper layer, at least one of said layers being substantially air-impermeable, each of said layers having a mouth end and a rod end, one of said layers being divided into first mouth-end and first rod-end bands along a line spaced from the mouth end of said layer by at most the length of said mouth-end filter segment, the second of said layers being divided into second mouth-end and second rod-end bands along a line spaced from the rod end of said layer by at most the sum of the length of said rod-end filter segment and the length of said portion of said tobacco rod, such that said first layer rod-end band overlaps said second layer mouth-end band in an overlap region between said division lines, said first layer mouth-end band being adhered to said second layer mouth-end band and said first layer rod-end band being adhered to said second layer rod-end band such that said overlap region is free of adhesive;

said tipping paper laminate is adhered to said filter plug except in said overlap region; and

said first layer has a first pattern of openings in said overlap region and said second layer has a second pattern of openings in said overlap region for registry with said first pattern;

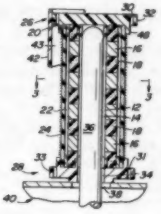
such that when said mouth-end filter segment is rotated relative to said rod-end filter segment, said first and second layers move relative to one another in said overlap region, varying the registry of said first and second patterns of openings, thereby varying the air dilution value of said filter cigarette.

4,687,010

HAIR CURLER

Richard Caruso, 7801 Montgomery Ave., Elkins Park, Pa. 19117

Filed Jul. 8, 1983, Ser. No. 511,818
The portion of the term of this patent subsequent to Jun. 12, 2001, has been disclaimed.
Int. Cl.[4] A45D *2/12*
U.S. Cl. 132—33 R **16 Claims**



1. A hair culer comprising a hollow core surrounded by a sleeve permeable to steam, said core being capable of being electrically heated and is coupled to an outer wall spaced from an inner wall by a ring of conductive material, the outer and inner walls having passage means for permitting steam to flow radially therethrough, said outer wall being radially inwardly of said sleeve, said sleeve being porous, and passage means for enabling steam of enter said core and exit radially through said sleeve, said passage means having an inlet adjacent one end of the core, whereby the hair culer may be heated by steam and by electrical means.

4,687,011

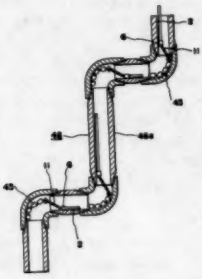
ROTARY CLEANING DEVICE FOR DRAIN PIPE AND THE LIKE

Uraki Masaru, 2-52-703, 4 Chome, Shiohama, Ichikawa-shi, Chiba-ken, Japan

Filed Sep. 24, 1985, Ser. No. 782,944
Claims priority, application Japan, Sep. 28, 1984, 59-203829
Int. Cl.[4] B08B *9/04*
U.S. Cl. 134—167 C **4 Claims**

1. A rotary cleaning device for drain pipes and the like, wherein a nozzle having a center axial line is provided at the forward end of a high pressure hose having a center axial line, and a universal guide is connected to the forward end of the nozzle, and said nozzle has means for jetting high pressure water from the nozzle in a rearward direction at an angle to said center axial line of the nozzle to generate a propulsion force on the nozzle by the reaction force of the water, and said device has means for urging the high pressure hose into the inside of the pipe and simultaneously rotating the high pressure hose, whereby the inside of the pipe is cleaned by the high pressure water jetted from the nozzle, the improvement com-

prising means mounted on said nozzle for changing the direction of the propulsion force of the nozzle by the rotation of the



high pressure hose for causing the nozzle to rotate in the pipe spirally along the inner peripheral surface of the pipe.

4,687,012

TELESCOPIC STICK FOR A SHORTENABLE UMBRELLA

Tilmann Schultes, and Joachim Seidel, both of Solingen, Fed. Rep. of Germany, assignors to Kortenbach Verwaltungs-und Beteiligungsgeselshcaft mgH & Co., Soligen, Fed. Rep. of Germany

Filed Feb. 3, 1986, Ser. No. 825,436

Claims priority, application Fed. Rep. of Germany, Jun. 7, 1985, 3520518

Int. Cl.[4] A45B *19/04*

U.S. Cl. 135—75 **8 Claims**

1. A telescopic stick of the hollow prismatic type for a shortenable umbrella, the stick having at least two, hollow telescopic parts sliding one inside the other and secured against relative twisting with respect to each other by having cross sections with complimentary polygonal profiles, means releasably-locking the parts in mutually extended and retracted positions; the improvement characterized in that each of the polygonal profiles comprise at least ten facets, said facets having a rectilinear flat shape along at least part of the length thereof, at least one of the facets in its extent from one edge to the next having an arcuate indentation extending in the cross-section thereof and along at least part of the length of said facet, whereby the complementary pair of the arcuate facets of the telescoping parts form interengaged longitudinal guides which prevent the respective longitudinal twisting of the stick parts while the ten faceted cross sections substantially approach a circular appearance, said stick being formed of a highly reflective material.

4,687,013

FLUERIC PARTIAL PRESSURE SENSOR

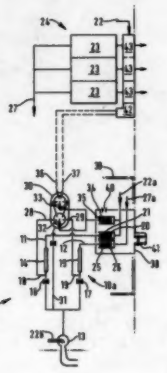
George F. Stevenson, Yeovil, England, assignor to Normalair-Garrett (Holdings) Limited, Yeovil, England

Filed Feb. 12, 1986, Ser. No. 828,659

Claims priority, application United Kingdom, Feb. 22, 1985, 8504567

Int. Cl.[4] G01N *7/00*; **F16K** *17/36*

U.S. Cl. 137—7 **8 Claims**



1. A method of changing control signals output by a flueric partial pressure sensor, said sensor comprising a flueric bridge having two legs adapted for respectively sensing a reference-gas and a sample-gas mixture, each leg including a linear flow resistor and an orifice flow resistor having values arranged to cause asymmetric flow rates through the two legs so that at a particular partial pressure of a constituent gas in the sample-gas mixture the bridge is in balance, the method including the steps of pressure referencing the reference-gas and the sample-gas mixture to a datum pressure and changing the datum pressure to change the control signals output by the sensor above a predetermined altitude.

4,687,014

METHOD AND APPARATUS FOR REDUCING THE RESPONSE TIME OF REMOTELY CONTROLLED, HYDRAULIC CONTROL SYSTEMS

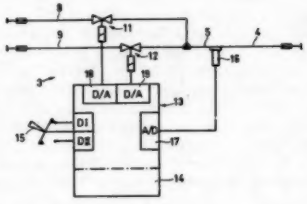
Egil O. Godal, Ammerudveien 98, Oslo 9, Norway

Filed Feb. 19, 1985, Ser. No. 702,565

Claims priority, application Norway, Aug. 17, 1984, 832958

Int. Cl.[4] G05D *16/00*

U.S. Cl. 137—14 **4 Claims**



1. In a method for reducing the pressure response time of a hydraulic line in a remotely controlled, hydraulic control system, said line having a near end and a far end, and wherein said method comprises the step of supplying hydraulic fluid to the line at the near end under admission pressure for achieving a desired pressure level at the far end of the line, and varying

said admission pressure for reducing the response time, the improvement comprising the step of subjecting the hydraulic fluid at the near end of the line to continuously pulsed pressure admission until said desired pressure level is achieved, and terminating each individual hydraulic fluid pulse essentially short of the transition time between flow passing from laminar to turbulent condition within the line and repeating the sequence with additional pulses thereby increasing the average fluid flow within the line to build up the pressure therein in a correspondingly shorter time.

4,687,015

PROCESS FOR THE SIMULTANEOUS CLEANING OF BOTH SEAT SURFACES OF A DOUBLE SEAT VALVE WITH A PRODUCT ACTION ON AT LEAST ONE SIDE AND DEVICE TO PERFORM THE PROCESS

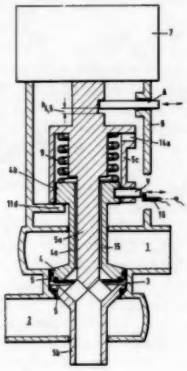
Hans O. E. Mieth, Hamburg, Fed. Rep. of Germany, assignor to Otto Tuchenhagen GmbH & Co. KG, Buchen, Fed. Rep. of Germany

Continuation of Ser. No. 283,185, Jul. 14, 1981, abandoned. This application Aug. 23, 1984, Ser. No. 643,747

Claims priority, application Fed. Rep. of Germany, Jul. 22, 1980, 3027647; Mar. 7, 1981, 3108778

Int. Cl.[4] F16K *25/00*

U.S. Cl. 137—238 **18 Claims**



1. A valve with two seat surfaces in a bore connecting first and second valve casings, said valve adapted to permit simultaneous cleaning of both seat surfaces without contaminating product that is in one of the valve casings, said valve comprising:

first and second closing elements, selectively contacting said seat surfaces to define valve-open and valve-closed positions, said closing elements being moveable between valve-closed and valve-open positions and moveable relative to one another for closing the opening a leakage cavity between said closing elements, one of said closing elements being in contact with the product during the cleaning of the seat surfaces;

an activating mechanism for moving at least one of said closing elements between a valve-closed and a valve-open position, at least one of said closing elements having a piston-like structure adapted for radially sealing said leakage cavity from said valve casings, said leakage cavity opening outside said double seat valve through an opening within a valve stem of one of said closing elements; and

means for limiting the movement of said piston-like element within said bore to a partial lift in the direction of a valve casing carrying the product, for cleaning the seat of said piston-like closing element, while simultaneously providing a partial lift to the other closing element in a direction such that both seat surfaces are exposed for contact with a cleaning agent.

4,687,016

EMERGENCY RELEASE VALVE APPARATUS

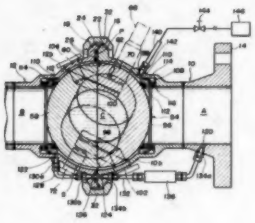
Susumu Takahashi, Niigata, Japan, assignor to Niigata Engineering Co., Ltd., Tokyo, Japan

Filed Sep. 24, 1986, Ser. No. 911,047

Claims priority, application Japan, Oct. 2, 1985, 60-219749; Dec. 5, 1985, 60-274242

Int. Cl.[4] F16L *37/28*

U.S. Cl. 137—240 **9 Claims**



1. An emergency release valve apparatus for releasably connecting together one ends of a pair of pipes through which a fluid flows, comprising:

a pair of tubular housings each having a fluid passage internally thereof, each of said pair of housings being adapted to be secured at one end to a respective one of said one ends of said pipes so as to be in fluid communication therewith, each of said pair of housings including a retaining portion having a generally hemispherical interior adjacent to the other end thereof;

coupling means for releasably coupling said pair of housings together generally in coaxial alignment with the other ends in abutment with each other, so that said hemispherical interiors cooperate to define a generally spherical space inside said housings;

a ball valve member disposed in said spherical space, said ball valve member comprising a pair of generally hemispherical valve elements which are releasably coupled together and respectively accommodated in said retaining portions of said housings in sealing relation thereto, said ball valve member being rotatable about an axis of rotation and having a fluid passage formed therethrough;

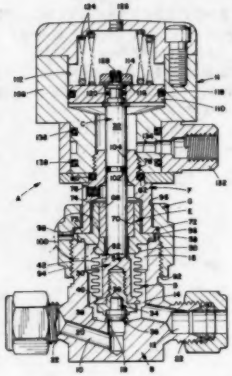
rotating means operable to rotate said ball valve member about said axis of rotation between an open position where said fluid passage of said ball valve member is in fluid communication with said fluid passages of said housings and a closed position where the fluid communication of said fluid passage of said ball valve member with said fluid passages of said housings is interrupted to isolate said fluid passage of said ball valve member from said fluid passages of said housings;

retaining means for retaining each of said valve elements in said retaining portion of a respective one of said housings in sealing relation thereto to close said fluid passage of a respective one of said housings when said pipes are released from each other; and discharge means for discharging fluid which remains in said fluid passage of said ball valve member isolated from said fluid passages of said housings in said closed position of said ball valve member, into said fluid passage of one of said pair of housings.

4,687,017
INVERTED BELLOWS VALVE

Oliver L. Danko, Chesterland, and Carl R. Bork, Jr., Euclid, both of Ohio, assignors to Nupro Company, Willoughby, Ohio

Filed Apr. 28, 1986, Ser. No. 856,718
Int. Cl.[4] F16K *43/00, 31/124*
U.S. Cl. 137—315 19 Claims



1. An inverted bellows valve comprising:

a valve body having a fluid chamber defined therein with inlet and outlet passages being in fluid communication with said chamber on opposite sides of a valve seat;

an elongated valve stem having a valve member at a first end operatively received in said chamber for cooperation with said seat to selectively control fluid flow between said inlet and outlet passages, a second end of said stem extending outwardly from said chamber;

a bellows disposed in said chamber in surrounding relation to an axial portion of said valve stem for isolating said stem from a system fluid in said chamber acting externally against said bellows;

a closing member sealingly engaging said valve body at an open end of said chamber and receiving said valve stem therethrough, said closing member being sealingly connected to one end of said bellows and having a shoulder thereon defining a limit stop for valve stem movement to a valve open position;

a circumferentially continuous bead having an arcuate cross-section and extending axially outward from one of said valve body and closing member for sealing engagement with a generally planar surface extending generally transversely of the axis of said stem and located on the other of said valve body and closing member;

an actuator operatively associated with said valve stem second end to effect reciprocating type movement of said stem between valve open and closed positions; a bonnet member connected directly between said closing member and said actuator; and,

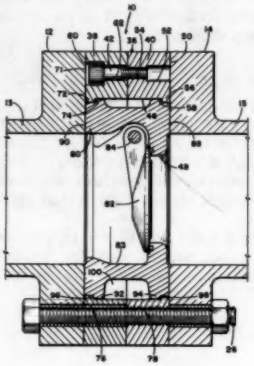
a retaining means at least partially surrounding said bonnet member and said closing member for applying an axially directed clamping force to said closing member and said bonnet member to produce sealing engagement between said bead and said generally planar surface.

3. The bellows valve as defined in claim 1 wherein said valve member includes a stem tip threadedly secured to said valve stem first end whereby said stem tip defines a replaceable sub-assembly.

4,687,018
JACKETED VALVE

Duane M. Eagen, and Robert K. Meek, both of Norman, Okla., assignors to Prince Valve, Inc., Norman, Okla.

Filed Jun. 9, 1986, Ser. No. 871,905
Int. Cl.[4] F16K *15/03*
U.S. Cl. 137—340 25 Claims



1. A valve of the type having substantially planar upstream and downstream faces to enable securing the valve between a pair of pipe flanges having a plurality of stud bores therethrough, said valve comprising:

a first substantially-cylindrical body portion having a pair of opposed substantially planar ends and a central bore therethrough;

valve means disposed in said central bore for restricting fluid flow therethrough;

a second substantially-annular body portion made up of two substantially identical halves having a pair of opposed substantially planar ends and a central bore therethrough, said first body portion being receivable in said second body portion central bore, said body portions presenting substantially planar upstream and downstream faces when said first body portion is so received; and

a plurality of axial stud bores disposed about the circumference of said second substantially-annular body portion, said stud bores being sized and spaced so that each second-body-portion stud bore may be aligned with a corresponding flange stud bore when said second body portion is received between said pipe flanges.

4,687,019
FLOAT VALVE ASSEMBLY

Windel O. Mayfield, P.O. Box 3005, Early, Tex. 76803

Filed Nov. 18, 1985, Ser. No. 798,857
Int. Cl.[4] F16K *15/04*
U.S. Cl. 137—375 12 Claims

1. A float valve assembly for use in oil well cementing operations comprising:

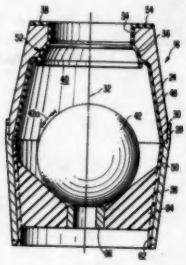
a valve body defining an internal chamber having an inlet and an outlet and a valve seat at said inlet;

resilient valve seal means in the chamber on said seat;

closure means movable in the chamber toward and away from contact with said valve seal means for closing and opening said inlet;

said valve seal means including a pair of deformable seal elements and a contoured portion, said elements and said portion being arranged and positioned along the path of movement of the closure means, said closure means being operable when the latter moves toward said contact with the seal means to first contact and deform a first one of

said elements to provide a primary seal, to then contact and deform the other element to provide a secondary seal



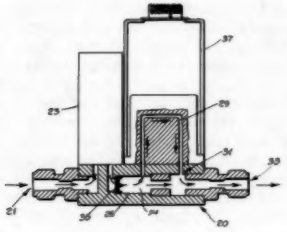
and to then contact the contoured portion to provide a tertiary seal.

4,687,020

FLUID MASS FLOW CONTROLLER

James H. Doyle, 1247 W. Grove Ave., Orange, Calif. 92665

Filed May 17, 1985, Ser. No. 735,466
Int. Cl.[4] F16K *31/02*
U.S. Cl. 137—486 **11 Claims**



1. A gas mass flow controller comprising:

a gas control valve responsive to a control signal to vary the rate of flow of a gas therethrough;

conduit means, defining a primary gas flow path, in communication with the valve;

gas flow dividing means, located downstream from the valve in the primary flow path, operative to divert a portion of the gas from the primary flow path;

sensor conduit means, in communication with the dividing means, defining an alternate gas flow path for receiving the diverted portion of the gas;

sensing means, downstream from the dividing means, for sensing the rate of flow of the gas through the alternate flow path and for providing a sensor input signal indicative of the rate of flow of the gas;

means, downstream from the sensing means, for merging the gas flowing in the alternate flow path into the gas flowing in the primary flow path;

control means, responsive to the sensing means to generate the control signal, the control means including amplifier means to amplify the sensor input signal, means to receive a flow rate signal indicative of a desired rate of flow of the gas, and comparator means to compare the amplified sensor signal with the flow rate signal and to provide the control signal indicative of any difference therebetween;

means to apply the control signal to the valve to maintain the flow of the gas through the primary flow path at a rate equal to the desired rate of flow as indicated by the flow rate signal; and

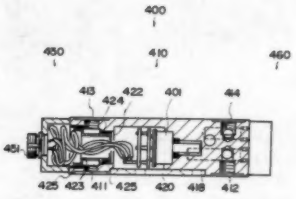
an automatic zero recalibrator, responsive to the amplified sensor signal and to a valve shut-off signal to correct for any long term sensor drift.

4,687,021

VACUUM VALVE-SENSOR DEVICE

Yoji Ise; Teruo Kanno, and Akira Yamaguchi, all of Tokyo, Japan, assignors to Myotoku Ltd., Tokyo, Japan

Filed Oct. 16, 1985, Ser. No. 787,905
Claims priority, application Japan, Oct. 29, 1984, 59-225893
Int. Cl.[4] F16K *27/00, 15/02*
U.S. Cl. 137—526 **4 Claims**



1. A vacuum valve-sensor device for mounting on a vacuum-generating source comprising, a rectangular block body having an inner cavity, a pressure sensor in said cavity, the block body having two adjacent chambers and a valve seat defined between the chambers and having a valve seat opening for communicating the two chambers, the block body having slidable therein a one-way valve for establishing and disestablishing communication between the two chambers, said one-way valve having a valve element in one of said chambers continuously biased in a direction for seating on said valve seat and closing the valve seat opening when pressure in said two chambers is substantially equal and when a pressure differential in said chambers is such the pressure in said one chamber is greater than the pressure in the other of said two chambers, means continuously biasing the valve element to a seated position, said block body having a first vacuum opening open to a surface thereof and to which a vacuum is applied from said vacuum source, the body block having passageways communicating the first vacuum opening and said cavity and said first chamber, the block body having a second vacuum opening to a surface thereof for applying therethrough a vacuum established through said two chambers, said first and second vacuum openings being disposed on opposite sides of said block body, the block body having a passageway providing communication between said second vacuum opening and the other of said two chambers, whereby when a vacuum is applied at said first vacuum opening the one-way valve element is unseated and said valve is opened and a vacuum is applied at said second vacuum opening and when pressure difference between the chambers is substantially equal the one-way valve is seated and a vacuum applied through said second vacuum opening is maintained.

4,687,022

PRESSURE RELIEF VALVE AND REGULATOR

Jacob E. Iverson, 181 SW. 15th Ct., Pompano Beach, Fla. 33060

Filed Jan. 9, 1986, Ser. No. 817,529
Int. Cl.[4] F16K *15/00*
U.S. Cl. 137—531 **2 Claims**

1. A pressure relief and regulator valve comprising:

(a) a valve chamber;

(b) a side port in said chamber for connecting to the pressure line to be monitored;

(c) a valve seat in said chamber opening to an exhaust and having a diameter slightly larger than the chamber diameter;

(d) a valve member which cooperates with said valve seat;

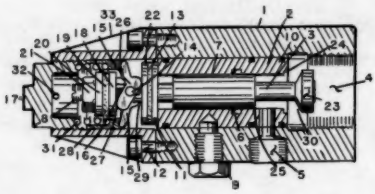
(e) a valve stem connected to said valve member, extending

rearwardly in said valve chamber and including a piston portion located to the rear of said side port and a rear extension out of said chamber;

(f) a longtitudinal slot in said extension;

(g) a moveable pin extending through said slot;

(h) a separate cam attached to each end of said pin; each cam



having a forward surface, an upper rearward surface and a lower rearward surface;

(i) a fixed stop engagable with the forward surfaces;

(j) a stop mounted on the valve stem and engageable with the lower surfaces; and

(k) spring retention means engageable with said upper surfaces and including a spring.

4,687,023

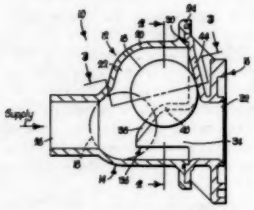
BALL CHECK VALVE

Joe A. Harbison, Gladstone, Mo.; Darryl M. Nielsen, Lenexa, and Dorothy D. McDaniel, Leawood, both of Kans., assignors to The Marley-Wylain Company, Mission Woods, Kans.

Filed Apr. 10, 1986, Ser. No. 849,961

Int. Cl.[4] F16K *15/04*

U.S. Cl. 137—533.13 **9 Claims**



5. A check valve housing comprising:

a generally bell-shaped casing having walls defining a chamber,

said casing presenting a flared, open end section and a fluid inlet in generally opposed relation to said open end section; and

a body removably connected to said casing end section for covering a portion of the latter,

said body having a fluid outlet,

said body including structure for guiding a ball along a path of travel between a first, flow impeding position adjacent said inlet and a second position spaced from said inlet,

said structure being received within said chamber defined by said casing walls.

4,687,024

NOZZLE HAVING DUAL HOSE SWIVEL

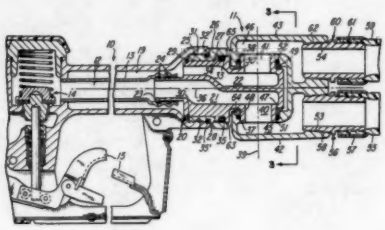
Jack A. McMath, Fort Thomas, Ky., assignor to Dover Corporation, New York, N.Y.

Continuation of Ser. No. 506,850, Jun. 22, 1983, abandoned.

This application Jan. 29, 1986, Ser. No. 823,936

Int. Cl.[4] F16L *39/04*

U.S. Cl. 137—615 **12 Claims**



1. In combination, a nozzle body having a first passage and a second passage extending therethrough and having a single threaded fluid connection at one end thereof which defines an enlarged end extension of an outer wall of said second passage and provides access to said first and second passages, said nozzle body having means for controlling flow of liquid through said first passage, a swivel having first means at one end thereof, attaching means attaching said first means of said swivel to said nozzle body, said attaching means comprising a threaded member threadedly attached to said threaded fluid connection and a retainer carried by said first means and engaging said threaded member, said first and second passages being concentric through a selected distance of said nozzle body at a location remote from said swivel and even with said swivel unattached from said nozzle body, said threaded member and retainer serving to rotatably support said first means for 360 degree rotation about a first axis, said first means having a first passage communicating with said first passage in said nozzle body by having an outer end portion thereof directly facing said first passage of said nozzle body and being coaxial with said first axis, said first means having a second passage communicating with said second passage in said nozzle body by having an outer end portion thereof directly facing said second passage of said nozzle body and being disposed on only one side of said first axis in offset spaced parallel relation thereto, second means rotatably supported by said first means for rotation about a second axis substantially perpendicular to said first axis, said second means having first connecting means for connecting said second means to a first hose and second connecting means for connecting said second means to a second hose, and said second means also having a first passage communicating at one end with said first passage in said first means and at its other end with said first hose and a second passage communicating at one end with said second passage in said first means and at its other end with said second hose.

4,687,025

SINGLE-CONTROL MIXING VALVE

Dieter Kahle, Iserlohn; Jürgen Humpert, Hemer, and Manfred Pawelzik, Soest, all of Fed. Rep. of Germany, assignors to Friedrich Grohe Armaturenfabrik GmbH & Co., Hemer, Fed. Rep. of Germany

Filed Jul. 2, 1985, Ser. No. 751,774

Claims priority, application Fed. Rep. of Germany, Jul. 3, 1984, 3424435; Feb. 2, 1985, 3503583

Int. Cl.[4] F16K *11/078*

U.S. Cl. 137—625.17 **19 Claims**

1. A mixing valve comprising:

a base plate adapted to be fixedly mounted on a base fitting;

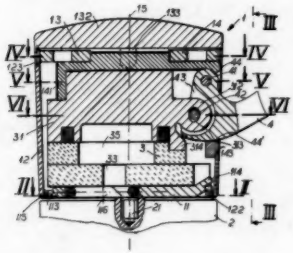
a sleeve centered on an axis, having a lower end rotatably

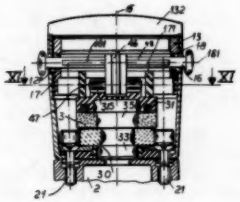
mounted on the base plate for rotation about the axis, having an internally threaded upper end, and formed with a radially open window;

a stationary valve plate fixed on the base plate inside the sleeve and formed with at least two incoming liquid ports and one outgoing liquid port spaced therefrom;

a movable valve plate flatly sitting on the stationary plate inside the sleeve and formed with a chamber alignable with the ports therein, the movable plate being angularly and radially displaceable relative to the axis so the chamber variously overlaps and interconnects the ports;

a control member fixed inside the sleeve to the movable valve plate;





a holddown ring threaded in the upper sleeve end and bearing axially downward on the member and valve plates;

a housing part engaged in the sleeve axially between the holddown ring and the control member and provided with an extension fitting snugly in the window and a pivot defining a pivot axis perpendicular to the axis of rotation of the sleeve; and

a control lever having an inner end pivoted on the control member about another pivot axis perpendicular to the axis of rotation of the sleeve and also pivoted on the housing part about its respective axis and an outer end projecting radially from the sleeve through the extension.

4,687,026

EQUIPMENT FOR CLOSING CONDUITS

Stig Westman, Rafsvagen 22, S-740 40 Heby, Sweden

Division of Ser. No. 657,169, Oct. 3, 1984, Pat. No. 4,585,033. This application Jan. 28, 1986, Ser. No. 823,462

Claims priority, application Sweden, Oct. 13, 1983, 8305640

Int. Cl.[4] F16L *55/12*

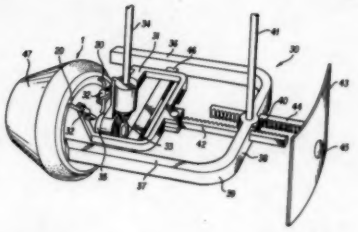
U.S. Cl. 138—89 **7 Claims**

3. A mounting device for closing a conduit disposed in the ground using a closing lid to be positioned within said conduit relative to the internal surface of said conduit and having a first disk and a second disk, a sealing ring of resilient material positioned between said first and second disks, and a nut member for axially moving said disks relative to each other in an axial direction, when said nut member is rotated, to cause said sealing ring to move in a radial direction relative to said internal surface of said conduit, comprising:

a main clamp member having a first end which forms a first support surface, and a second end;

a second support surface having a first rack extending therefrom, said first rack extending in a first direction and being coupled to said main clamp member at said second end, said second support surface and said first rack being movable relative to said second end;

an attachment member having a second rack extending from one end thereof, said second rack extending in a second direction opposite of said first direction and being coupled to said main clamp member at said second end, and having



another end, said attachment member and said second rack being movable relative to said second end;

a cog wheel operatively positioned relative to said first and second racks for causing said first and second racks to move relative to said second end of said main clamp in opposite directions; and,

a nut rotating member coupled to said another end of said attachment member including a nut engaging sleeve, a first angular gear attached to said nut engaging sleeve, a second angular gear mating with said first angular gear, and a shaft extending from said second angular gear for turning said second angular gear.

4,687,027

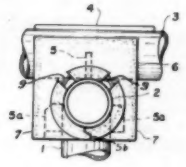
INSULATOR FOR WATER-COOLED SKID AND CROSSOVER PIPE NETWORK

Matthias R. Magera, R.D. #4, Box 13, McDonald, Pa. 15057

Filed Feb. 24, 1986, Ser. No. 832,018

Int. Cl.[4] F16L *9/22;* **F27D** *3/02*

U.S. Cl. 138—149 **2 Claims**



1. For use to insulate the joint between a long skid pipe lying, at right angles, on a crossover pipe in a reheating furnace; the invention comprising two refractory insulator halves, each half having a top portion and two pivoted lower side portions extending at right angles to said top portion comprising a pair of refractory insulator halves, each half having a substantially semi-circular arcuate inner surface for abutting against and substantially surrounding a correspondingly shaped outer surface of said long skid pipe, said lower side portions comprising refractory insulator portions, each lower side portion is pivotally connected to one of said upper insulator refractory insulator halves through reticulated wires embedded in said upper and lower refractory insulator halves at the top portion of said crossover pipe, whereby said lower refractory insulator halves may be pivotally opened or closed

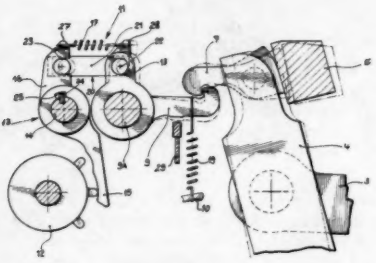
through said reticulated wires in surrounding relationship to said crossover pipe.

4,687,028

NEGATIVE DOBBY FOR WEAVING LOOMS

Gianluigi Cremonesi, Ponte Nossa, Italy, assignor to Fimtessile Fabbrica Italiana Macchinario Tessile S.p.A., Ponte Nossa, Italy

Filed Apr. 21, 1986, Ser. No. 853,954
Claims priority, application Italy, Apr. 24, 1985, 20487 A/85
Int. Cl.[4] D03C *1/06*
U.S. Cl. 139—71 **3 Claims**



1. Negative dobby for forming a warp shed in weaving looms of a type wherein rocking movements imparted on rockers (4), which control the shifting of heald frames (2) by a pair of movable cross members (5, 6), are controlled by hooks (7, 8) pivoted to ends of said rockers (4) and by crooks (9, 10) cooperating with said hooks (7, 8) and operated by means (12) reading the pattern of the fabric to be woven comprising a rocking lever (13) having first and second arms, said first arm (15) cooperating with said pattern reading means (12); a square arm (18) on said crook (9); a spring (17) elastically connected to said second arm (16) and said square arm (18); stop means (20) interposed between said second arm (16) and said square arm (18); spring return means (19) biasing said crook (9) away from said hook (7); a first shaft (9A) around which square arm (18) pivots and a second shaft (14) around which rocking levers (13) pivot, the rocking movements of the crook (9) being controlled by said rocking lever (13).

4,687,029

MEANS FOR LIFTING MOTION OF A HEDDLE FRAME

Hiroshi Takada, Kyoto, Japan, assignor to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Sep. 10, 1985, Ser. No. 774,297
Claims priority, application Japan, Sep. 18, 1984, 59-196370; Feb. 28, 1985, 60-39371
Int. Cl.[4] D03C *1/14*
U.S. Cl. 139—84 **3 Claims**

1. Means for lifting motion of a heddle frame for use in a dobby having a heddle frame and a harness cord adapted for operating said heddle frame, wherein said means is installed internally of side columns of a frame of a loom wherein said means includes:

an externally threaded rod secured to one end of said harness cord;

a rocking member pivotally disposed and connected to said heddle frame by means of a connecting rod;

a spring interconnected between said rocking member and a fixed position for urging said rocking means to a reference position;

a corossbeam;

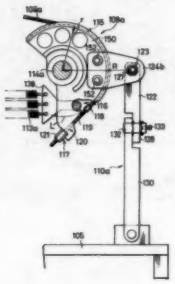
a guide rod and a threaded rod provided adjacent to the crossbeam; and

an adjustment nut engaged with said rocking member and internally threaded to receive said threaded rod;

said rocking member being pivoted to move said heddle frame in one direction against the action of said spring upon being pulled by said dobby through said harness cord;

said rocking member being allowed to oscillate back to said reference position moving said heddle frame in the opposition direction, being pulled by said spring, upon the pull on said harness cord being released;

said adjustment nut being turned in either direction to cause said threaded rod to move relative thereto to therbyt set said rocking member to a new reference position;



wherein one end of said spring is engaged in an engaging hook which is provided in the lower end of the rocking member and the other end of said spring is secured to an engaging member disposed at underside of said horizontal crossbeam so that the spring is expanded in a horizontal direction;

wherein said engaging member is provided to be movable along the horizontal crossbeam;

wherein said engaging member comprises a guide block integrally formed with a supporting plate, and having apertures therethrough through which said guide rod and said threaded rod may pass, said threaded rod being turned to move the supporting plate along the guide rod adjacent to the horizontal crossbeam to adjust the tension of the spring

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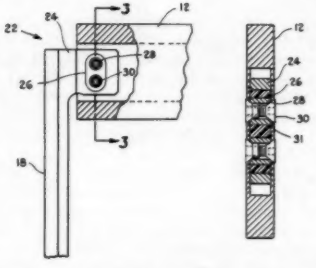
4,687,030

HEDDLE FRAME FOR A HIGH SPEED WEAVING MACHINE

Gene E. Faasse, Taylors, S.C., assignor to Steel Heddle Manufacturing Co., Greenville, S.C.

Filed Aug. 14, 1986, Ser. No. 896,980
Int. Cl.[4] D03C *9/06*
U.S. Cl. 139—91 **9 Claims**



1. In a heddle frame having a pair of laterally extending cross rails and a pair of end braces connected to adjacent ends of said pair of cross rails to form a rectangular frame, wherein each of

the connections between said end braces and said laterally extending rails comprise:

(a) an elongated opening within the end of said cross rails;

(b) a projection extending laterally from said end brace, into said opening in the cross rail, wherein the width of said projection is less than the width of said opening; and

(c) means to resiliently connect said projection to the side walls of the cross rail into which it extends, to provide a connection which is rigid when not under stress but which has limited flexibility to permit limited vertical movement of the cross rails relative to the end braces whenever the cross rails are under vertical stress.

4,687,031

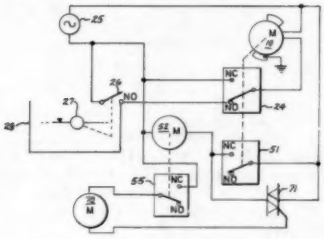
VALVE CONTROL WITH MECHANICAL MEMORY

Paul R. Goudy, Jr., Bayside; William G. Weekley, Milwaukee; Donald L. Dovala, Grafton, and Thomas C. Olszewski, Sr., Milwaukee, all of Wis., assignors to Autotrol Corporation, Milwaukee, Wis.

Filed Jan. 10, 1986, Ser. No. 818,526

Int. Cl.[4] B65B *3/04*

U.S. Cl. 141—9 **15 Claims**



12. A method of dispensing a dosage of a chemical additive in proportion to the quantity of a fluid added to a reservoir, comprising:

discharging successive units of a fixed quantity of the fluid into the reservoir;

providing a short energizing pulse to a low speed motor for each unit of the fixed quantity of fluid discharged;

rotating a cam by the motor one increment for each pulse to the motor; and

actuating a switch that dispenses a dosage during a portion of a complete revolution of the cam.

4,687,032

FIRE EXTINGUISHER EXTRACTOR APPARATUS

Freddy Self, 933 Parkside Dr., Richmond, Calif. 94803

Filed Aug. 19, 1985, Ser. No. 766,516

Int. Cl.[4] B65B *1/04*

U.S. Cl. 141—18 **6 Claims**

1. An apparatus for extracting fire extinguisher powder from a fire extinguisher comprising:

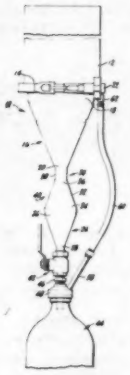
a. a container for the powder, said container having a mouth;

b. a first funnel having a wide opening at a first end and a relatively narrow opening at a second end said first funnel being connectable to said container with said wide opening of said first funnel communicating with said mouth of said container;

c. a second funnel having a wide opening at a first end and a relatively narrow opening, at a second end said wide opening of said second funnel lying adjacent and apart from said narrow opening of said first funnel;

d. means for connecting said narrow opening of said first funnel to said wide opening of said second funnel to form a funnel unit, said connecting means extending from said second end of said first funnel to said first end of said second funnel, said funnel unit permitting flow of fire extinguisher powder through said first and second funnels;

e. means for attenuating the lumping of the fire extinguisher powder traveling from said container through said funnel unit and from said narrow opening of said second funnel; and



f. means for communicating said narrow opening of said second funnel with said fire extinguisher, such that fire extinguisher powder is able to gravity flow from said container to said fire extinguisher when said container is above the fire extinguisher and is able to gravity flow in the opposite direction when the fire extinguisher is above the container.

4,687,033

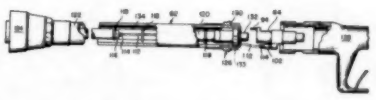
VENTURI LIQUID EVACUATOR SYSTEM FOR MAINTAINING CLEAR VAPOR PATH IN VAPOR RECOVERY HOSE

Roger W. Furrow, High Point; Harold R. Young, Kernersville, and G. Frank Dye, Greensboro, all of N.C., assignors to Gilbarco, Inc., Greensboro, N.C.

Continuation of Ser. No. 590,063, Mar. 15, 1984, abandoned. This application May 19, 1986, Ser. No. 864,569

Int. Cl.[4] B65B *57/14*; B67D *5/06*

U.S. Cl. 141—59 **11 Claims**



1. A fuel dispensing system comprising:

nozzle means for dispensing fuel;

a product hose for delivering fuel from a storage tank to said nozzle means via a pump;

a vapor recovery hose coaxial with and containing said product hose, and connected to said nozzle means for providing a vapor path in the space between said product and vapor recovery hoses, for removing vapors developed at said nozzle means during the fueling of a vehicle; and

pump means coaxially located in a fuel flow path of said product hose, and operable by and over a range of flow rate of said fuel through said product hose, said pump means including means for sucking fuel into said product hose from an area of said vapor path which tends to be at a low point where fuel may accumulate due to backflow from said nozzle means during a refueling operation, thereby substantially ensuring a clear vapor path.

4,687,034

CONTROLLED RELEASE INSERT FOR A DIESEL FUEL SUPPLY NOZZLE AND METHOD OF ADDING A PETROLEUM SUBSTRATE OVER SAID INSERT

Leonard B. Graiff, Gatesheath Hall, England, and Robert T. Holmes, Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed May 28, 1986, Ser. No. 867,664
Int. Cl.[4] B67D *5/04*
U.S. Cl. 141—69 **17 Claims**

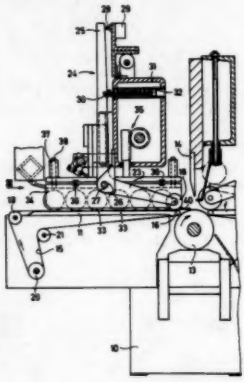
1. A sleeve for a fuel tank nozzle having an interior lining which comprises a time release polymeric matrix impregnated with an anti-foam silicon compound.

4,687,035

MACHINE FOR PROCESSING PLYWOOD SHEETS

Hans-Heinrich Kuper, Jüddeldamm 24, and Theo Grönebaum, Eschenweg 24a, both of 4835 Rietberg, Fed. Rep. of Germany

Filed Jan. 27, 1986, Ser. No. 822,896
Claims priority, application Fed. Rep. of Germany, Feb. 2, 1985, 3503573
Int. Cl.[4] B27B *1/00;* **B27M** *3/00*
U.S. Cl. 144—2 R **12 Claims**



1. A machine adapted for processing relatively thin plywood sheets of a fluctuating thickness continuously conveyed one behind the other, comprising in combination

a machine table, including transporting means for transporting plywood sheets in a transporting direction,

cutting means for cutting the plywood sheets,

sensing means for testing the thickness of the plywood sheets, said sensing means including a plurality of pivotable parallel levers, and a plurality of substantially identical testing rollers, each testing roller being arranged on a respective one of said pivotable parallel levers, being located above said machine table, and being adapted to abut against said plywood sheets transported by said transporting means,

wherein said transporting means includes at least one transporting band which is rotatably arranged on said machine table, and is arranged upstream of said transporting and supporting roller as considered in the transporting direction, an abutment plate disposed on said machine table below said transporting band facilitating sliding of said transporting band thereover,

wherein said cutting means includes a horizontally positioned transporting and supporting roller, and a cutter movable upwardly and downwardly above said transporting and supporting roller,

a rerouting shaft arranged opposite said transporting and supporting roller, and having a diameter considerably smaller than that of the latter, at least one of said testing rollers being arranged above each of said transporting bands very close to a surface of said rerouting shaft, and

supporting means for supporting said rerouting shaft, and being free of any axle supporting the latter, but including a segment bearing shell which is mounted on said machine table, and supports said rerouting shaft in a region which faces away from the transporting band,

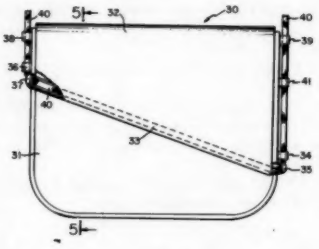
a portion of said transporting band opposite said segment bearing shell passing over said rerouting shaft and pressing the latter against said segment bearing shell constituting a remainder of said supporting means, so that an accurate guidance of said supporting band is ensured in a region adjacent to said transporting and supporting roller.

4,687,036

HANDBAG OR BACKPACK WITH A FLAP CLOSURE

Johnnie Thomas, 1320 Gust La., Chesapeake, Va. 23323

Filed Nov. 7, 1985, Ser. No. 795,853
Int. Cl.[4] A45C *3/06, 13/10, 13/20*
U.S. Cl. 150—118 **13 Claims**



11. A bag in the form of a backpack comprising a pouch having an opening and a flap for closing said opening, at least one pair of pulley loops attached externally to the sides of said pouch, and a single, continuous drawstring means passing through the external loops and enclosed by and passing through a sewn edge of the flap transverse to the opening, whereby opening the flap pulls the continuous drawstring means in one direction and pulling the drawstring means oppositely closes the flap.

13. A handbag comprising a pouch having an opening and a flap for closing said opening, at least one pair of soft, flexible pulley loops mounted externally one on each side, from one to four soft, flexible tension and balancing loops mounted externally to said pouch, as evenly divided as possible as to side of said pouch, and attached above said pulley loops, and single soft, flexible, continuous drawstring means passing through said loops and enclosed by and passing through a sewn edge of the flap transverse to said opening, whereby opening the flap pulls the single continuous drawstring means in one direction and pulling the drawstring means oppositely closes the flap.

4,687,037
PNEUMATIC VEHICLE TIRE

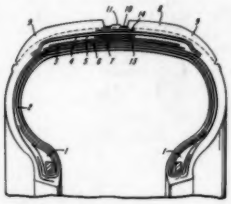
Hans-Dieter Pfeiffer; Heinrich Huinink, both of Garbsen, and Thorsten Reese, Neustadt, all of Fed. Rep. of Germany, assignors to Continental Gummi-Werke Aktiengesellschaft, Hanover, Fed. Rep. of Germany

Filed Aug. 28, 1985, Ser. No. 770,413

Claims priority, application Fed. Rep. of Germany, Aug. 29, 1984, 3431655

Int. Cl.[4] B60C *11/04*

U.S. Cl. 152—209 R **3 Claims**



1. A pneumatic vehicle tire which is provided with a belt and with tread rib sections which are separated from one another by a circumferential groove; said tire in combination comprising:

at least one cord fabric ply disposed in the vicinity of said circumferential groove to reinforce said belt; each of said cord fabric plies essentially extending over the width of a given one of said circumferential groove;

said cord fabric plies having a width slightly greater than the width of said circumferential groove;

said tire including only a single circumferential groove extending continuously and located across the support surface of the treat profile, and two tread rib sections which have a given support surface, with the width of said circumferential groove being 20–25% of the width of said support surface; and in which the width of said cord fabric plies is approximately 50 to 70% greater than the width of said circumferential groove;

said circumferential groove having a base on which is provided a circumferential raised portion disposed with an upper surface thereof below the support surface of the tread profile;

said tire including said two tread rib sections, each of which comprises ribs which extend parallel to one another and at an angle to the circumferential direction of said tire; viewed as a whole, said ribs of said treat rib sections being symmetrically disposed in the shape of a V.

4,687,038
BLIND CONSTRUCTION

Ralph Clemente, Maywood, N.J., assignor to Coronet Industries, Inc., Atlanta, Ga.

Filed Dec. 19, 1983, Ser. No. 562,532

Int. Cl.[4] A47H *3/08;* **E06B** *9/262*

U.S. Cl. 160—84 R **8 Claims**

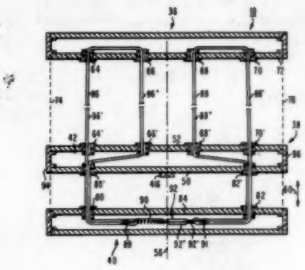
1. A blind construction comprising:

first, second, and third parallel sills;

a plurality of slats coupled to and between said first and third sills;

first and second spaced string loops engaged with said slats and sills symmetrical to a central axis normal to said sills, said third sill being movable between said first and second sills along said axis and slidably frictionally engaged with said loops at locations symmetrical relative to said axis; and

tension adjustment means connected to said loops at one of said first and second sills for simultaneously setting the tension on both said loops to the same desired value in a range of values to thereby symmetrically set the friction between said loops and said third sill wherein said first, second, and third sills include first and second sets of hollow inserts aligned in corresponding first and second columns parallel to said axis, said first and third sills include third and fourth sets of hollow inserts aligned in



third and fourth columns parallel to said axis, the inserts of said third set facing one another, the inserts of the fourth set facing one another; one of said string loops passing through said first and third sets of inserts, and the other string loop passing through the second and fourth sets of inserts.

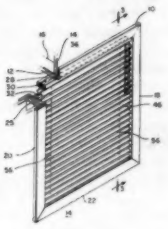
4,687,039
INSULATIVE PLEATED WINDOW SHADE

James F. Chumbley, 16108 Inglewood Rd., Bothell, Wash. 98011

Filed Apr. 17, 1985, Ser. No. 721,380

Int. Cl.[4] A47H *5/00*

U.S. Cl. 160—84 R **13 Claims**



1. A window shade and hanging system, comprising:

(a) a centering guide affixed to the bottom of the window frame head and extending substantially from one side of the window to the other;

(b) a shade mounting block connectible with the centering guide across essentially the entire width of the window;

(c) a first pleated shade fabric which is connected to the block and which extends substantially over the entire area of the window when drawn, the fabric including a vacuum deposited, aluminized reflective layer on one side;

(d) a second pleated shade fabric having pleats of substantially the same size as the first fabric, the second fabric being connected to the block in parallel alignment with the first fabric to define a chamber between the fabrics, the fabrics being spaced apart a distance slightly greater than the length of one pleat to ensure that the fabrics do not interweave and overlap when the shade is raised, the second fabric also including one vacuum deposited, aluminized reflective layer on one side, the aluminized layers facing the chamber on each fabric;

(e) a base member connected to both fabrics at the bottom of each fabric; and

(f) means for raising and lowering the shade by lowering or raising the base with respect to the block.

4,687,040

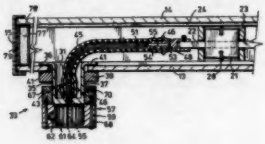
ADJUSTING DEVICE FOR A SLAT BLIND

James Ball, 14236 Greencrest Drive, White Rock, British Columbia, Canada V4A 2Y6

Filed Mar. 17, 1986, Ser. No. 840,643

Int. Cl.[4] E06B *3/32*

U.S. Cl. 160—107 **11 Claims**



1. A sealed double glazed window, comprising:

two spaced panes of glass sealed in a frame;

a slat blind positioned in the space between the panes, the blind having slat tilt angle control means associated therewith;

an aperture defined through one pane of glass providing access to the slat tilt angle control means of the blind;

an adjusting device sealingly mounted about the aperture so that the tilt angle of the slats may be adjusted while maintaining thw window seal, the device comprising a plug including a threaded outer cylindrical surface extending outwardly through the aperture and having an annular flange portion engaging a surface of the pane of glass, the flange being sealed about the aperture, the plug defining a tubular portion being open at both ends thereof and extending inwardly from a planar front surface of said pulg, a flexible tube sealed about the tubular portion and extending therefrom into a sealing engagement with the slat tilt angle control means of the blind, a flexible cable being attached at one end to the tilt angle control means, said cable extending through the flexible tube and tubular portion so that the other end thereof may be manipulated to adjust the tilt angle of the slats, and a nut coacting with the threaded outer surface of the plug to provide a sealing engagement of the plug about the aperture.

4,687,041

GUIDED CORD SYSTEM FOR A RETRACTABLE SLATTED BLIND ASSEMBLY

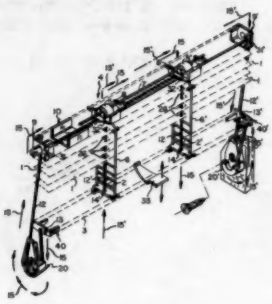
Richard N. Anderson, Owensboro, Ky., assignor to Hunter Douglas Inc., Totowa, N.J.

Filed Dec. 19, 1983, Ser. No. 562,540

Int. Cl.[4] E06B *9/30*

U.S. Cl. 160—168 R **5 Claims**

1. A guided cord system for a retractable slatted blind assembly comprising a plurality of slats, a headrail adapted to be fixed to a structure, a movable bottomrail, a pair of lift cords for raising and lowering the blind assembly, each cord of said pair being connected at both its ends to said bottomrail, guide means associated with said headrail for guiding each of said cords through said headrail whereby one cord of said pair will leave said headrail near one end thereof and the other cord of said pair will leave said headrail near the other end thereof, a first turning means and a second turning means for guiding the cords substantially 180° with said first turning means adapted to be fixed to a structure below and near one end of the bottomrail and the second turning means adapted to be fixed to a structure below and near the other end of the bottomrail, each cord of said pair extending upwardly from said bottomrail, passing over its guide means, extending downwardly and around its turning means and upwardly to a connecting point on said bottomrail, a first point of connection of one cord of said pair with the bottomrail is at one end of the bottomrail and a first point of connection of the other cord of said pair with



the bottomrail is at the other end of the bottomrail and wherein a second point of connection of each cord with the bottomrail is between the two points of connection of the other cord of said pair with the bottomrail, said pair of cords being positioned in and operating in substantially the plane of the blind assembly in the lowered position.

4,687,042

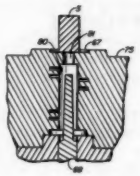
METHOD OF PRODUCING SHAPED METAL PARTS

Kenneth P. Young, Chesterfield, Mo., assignor to Alumax, Inc., San Mateo, Calif.

Filed Jul. 23, 1986, Ser. No. 888,221

Int. Cl.[4] B22D *17/00, 23/00*

U.S. Cl. 164—80 **3 Claims**



1. A process for producing shaped metal parts comprising

(a) introducing a metal preform to a prechamber of a shaping means used to shape a metal part from the preform, said preform metal being characterized as comprising a semi-solid slurry of primary solid phase particles ina lower melting point molten metal, said metal preform being further characterized as possessing a dendritic metal shell about its periphery which substantially entirely resides within the prechamber upon formation of the metal part;

(b) forming the shaped metal part in a die cavity by applying pressure to the metal preform located in the prechamber causing a portion of the metal preform to assume the shape of the shaped metal part and a portion of the preform, including the substantially entire dendritic metal shell, to remain in the prechamber; and

(c) withdrawing the shaped metal part from the shaping means and, thereupon, removing the metal which re-

mained in the prechamber during the forming of the metal part from the metal part itself.

4,687,043

COMPOSITE CASTING PROCESS

Franz Weiss, Neckarsulm; Dieter Eschenweck, Mosbach, and Manfred Stark, Neckarsulm, all of Fed. Rep. of Germany, assignors to Kolbenschmidt Aktiengesellschaft, Neckarsulm, Fed. Rep. of Germany

Filed Mar. 18, 1986, Ser. No. 840,803

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1985, 3511542

Int. Cl.[4] B22D *19/14*

U.S. Cl. 164—97 **6 Claims**

1. In a composite casting process for manufacturing components which comprise castings of silicon-containing aluminum alloys and are intended to define the combustion chamber of internal combustion engines, and shaped elements, which are bonded to the castings at surfaces to be subjected to high thermal and/or mechanical loads and consist of inorganic non-woven fibers or whiskers and have a fiber or whisker volume of 10 to 50% and have been infiltrated with an aluminum alloy which has a melting point that is higher, preferably by 30° to 140° C., than the melting point of the aluminum alloy of the casting, which infiltration is effected under a pressure which is maintained until said infiltrating aluminum alloy has solidified and in such a manner that the infiltrating aluminum alloy forms on the shaped element a cover layer in the regions in which the shaped elements are to be bonded to the casting, the improvement comprising: dipping the shaped elements, which have been infiltrated with a wrought aluminum alloy and provided with a cover layer consisting of the wrought aluminum alloy, into a molded solder alloy having a melting temperature between 150° and 400° C. to provide a molten layer consisting of the solder alloy; and subsequently placing the dipped elements in a predetermined position in the heated casting mold to maintain the solder alloy in the molten state; and then casting in said mold.

4,687,044

INJECTION METHOD AND APPARATUS

Clarence L. Wallace, Del Mar, Calif., assignor to Tam Ceramics, Inc., Niagara Falls, N.Y.

Filed May 3, 1985, Ser. No. 730,399

Int. Cl.[4] B22D *13/00, 19/00*

U.S. Cl. 164—100 **66 Claims**

1. An apparatus for injecting a first metal into thin plate-shaped recesses in a workpiece body to form electrode plates in a multilayer capacitor, said workpiece body having capacitor terminals formed of a second metal, said second metal having a higher melting point than the melting point of said first metal, said apparatus comprising:

a frame;

a boom rotatably mounted to said frame;

drive means operatively linked to said boom for rotating same about an axis of rotation at a high speed, said boom having at least one free end spaced from said axis of rotation;

a carrier member pivotably mounted to said boom at said free end, said carrier member being provided with a pressurization recess having a mouth and a closed end opposite thereto;

retaining means disposable in said pressurization recess for retaining therein a multiplicity of workpiece bodies each formed with a plurality of thin plate-shaped recesses and having capacitor terminals formed of the second metal;

feed means provided on said boom for feeding the first metal in liquified form to said recess through said mouth;

heating means including heater elements disposed in said carrier member in juxtaposition to said pressurization recess for supplying thermal energy to the liquified first metal in said recess to maintain the first metal in liquified form during a metal injection phase of an operating cycle;

counterweight means operatively coupled to said boom for balancing the mass of said boom and said carrier means with respect to said axis of rotation; and

actuator means operatively coupled to said carrier member for pivoting same from a first angular orientation, in which said mouth and said closed end are aligned in a direction perpendicular to said axis and with said mouth being disposed between said closed end and said axis, to a second angular orientation in which said mouth and said closed end are aligned in said direction and with said closed end being disposed between said axis and said mouth, whereby centripetal acceleration of said carrier member during said metal injection phase of an operating cycle causes a pressurization of the liquified first metal in said pressurization recess to force the first metal into said plate-shaped recesses of said ceramic bodies and whereby the liquified first metal is ejected from said pressurization recess during a discharge phase of an operating cycle.

4,687,045

PROJECTILE-CASTING INGOT MOLD

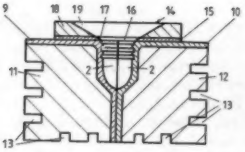
Johannes Roller, A-1070 Wien Siebensterngasse 43, Vienna, Austria

Filed Mar. 31, 1986, Ser. No. 846,598

Claims priority, application Austria, Apr. 9, 1985, 1057/85

Int. Cl.[4] B22D *31/00*

U.S. Cl. 164—262 **12 Claims**



1. An ingot mold for casting a lead or lead alloy projectile, the mold comprising two like ingot mold halves having abutting sides and upper and lower sides extending outwardly therefrom, the abutting mold half sides defining like cavity halves open towards the upper sides of the mold halves and forming a mold cavity for casting the projectile, and each mold half consisting essentially of a first part of a metal having a high

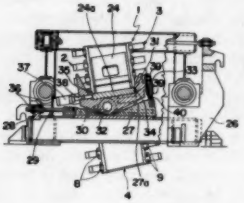
wettability for the lead or lead alloy being cast, the first metal parts of the mold halves defining the mold cavity, and a second part of a metal having a higher thermal conductivity than the first metal part, the second metal part being in heat conducting contact with the first part.

4,687,046

TOP ROLLER APRON IN A CONTINUOUS CASTING ASSEMBLY

Herbert Lemper, McMurray, Pa., assignor to Kabushiki Kaisha Kobe Seiki Sho, Kobe, Japan

Filed Mar. 3, 1986, Ser. No. 835,786
Int. Cl.[4] B22D *11/12, 11/128*
U.S. Cl. 164—442 **8 Claims**



1. A top roller apron assembly in a continuous casting assembly, comprising:

a pair of narrow-face frames having a first and second side;

a back face side frame which comprises a plurality of first unit roll frames connected to said first side of said narrow-face frames;

an inside face side frame which comprises a plurality of second unit roll frames connected to said second side of said narrow face frames;

a plurality of rolls mounted side by side on each of said side frames wherein each unit roll frame supports a single roll of said plurality of rolls;

means for removably attaching opposite end portions of each of said unit roll frames to side wall portions of said pair of narrow-face frames; and

a main frame wherein a support portion for supporting each of said narrow-face frames to said main frame is mounted on said main frame, and

means mounted for pivoting said narrow-face frames about a fulcrum portion of said support portion and wherein said support portion further comprises an open faced slide base having a V-shaped receiving portion and movable towards the back face side and inside face side and a tapered support frame having a V-shaped surface mounted on said V-shaped receiving portion mounted on said open faced slide base and pivotably supported through a pivot pin.

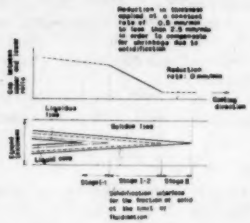
4,687,047

CONTINUOUS CASTING METHOD

Shigeaki Ogibayashi; Mamoru Yamada; Tatsuo Mukai; Makoto Tezuka, and Masazumi Hirai, all of Kimitsu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Aug. 1, 1986, Ser. No. 892,075
Claims priority, application Japan, Aug. 3, 1985, 60-171314; Aug. 3, 1985, 60-171315; Dec. 30, 1985, 60-298773; Dec. 30, 1985, 60-298774; Jun. 13, 1986, 61-136276
Int. Cl.[4] B22D *11/00*
U.S. Cl. 164—476 **6 Claims**

1. A method of the continuous casting of molten metal by continuously withdrawing a strand, characterized in that the thickness of the strand is continuously reduced at a rate of 0.5 mm/min to less than 2.5 mm/min in the region between the point of time when the center of the strand has a temperature corresponding to a solid-phase ratio of 0.1 to 0.3 and the point of time when said temperature has dropped to a level corresponding to the solid-phase ratio at the limit of fluidization, while substantially no reduction in thickness is effected in the



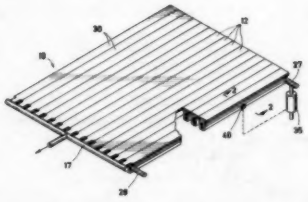
region between the point of time when the center of the strand has a temperature corresponding to the solid-phase ratio at the limit of fluidization and the point of time when said temperature has dropped to the solidus line.

4,687,048

MONOGROOVE COLD PLATE

Fred Edelstein, Hauppauge, and Richard F. Brown, Bethpage, both of N.Y., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jun. 18, 1986, Ser. No. 875,799
Int. Cl.[4] F28D *15/00*
U.S. Cl. 165—1 **12 Claims**



1. In a method for operating a two-phase cold plate, the plate including at least one heat pipe, said heat pipe having a large diameter vapor channel, a small diameter liquid channel, and a transfer groove interconnecting said vapor channel with said liquid channel, liquid inlet means connected to the heat pipe for introducing liquid coolant into the liquid conducting channels of the heat pipe, and gas outlet means connected to the heat pipe for removing coolant vapor from the vapor conducting channels of the heat pipe, the method comprising:

(a) detecting the amount of liquid in the liquid conducting channels of the cold plate, and

(b) admitting liquid coolant into the heat pipe upon detecting a quantity of liquid therein below a predetermined level.

4,687,049

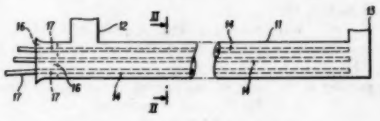
THERMALLY REVERSIBLE HEAT EXCHANGE UNIT AND METHOD OF USING SAME

Peter M. Golben, Wyckoff, N.J., assignor to Ergenics, Inc., Wyckoff, N.J.

Continuation of Ser. No. 377,556, May 12, 1982, abandoned. This application Nov. 14, 1986, Ser. No. 930,675
Int. Cl.[4] F28D *21/00*
U.S. Cl. 165—1 **12 Claims**

7. A method of using a thermally reversible heat exchange unit comprising an elongated tubular jacket having a predetermined length and an inner wall of predetermined diameter, said

jacket having an inlet at one end and an outlet at the other end, an elongated tubular metal heat transfer surface positioned in the jacket essentially longitudinally of the jacket and substantially equal in length to the length of said jacket, there being a space within the inner wall of said jacket, configured to permit a heat exchange liquid to flow between the inner wall of said



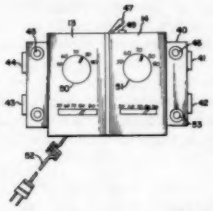
jacket and said heat transfer surface and wherein the ratio of said length of said jacket to its inside diameter is greater than 50 to 1, said method comprising the steps of continuously forcing heat exchange liquid into said inlet and out said outlet, alternately at a high entering temperature and at a low entering temperature, at a specific flow rate great enough to obtain plug flow of said heat exchange liquid through said jacket.

4,687,050

DUAL THERMOSTAT CONTROLLED OUTLETS

Kalman Podlipnik, 7911 Kennedy Blvd., North Bergen, N.J. 07047

Filed Oct. 15, 1985, Ser. No. 787,085
Int. Cl.[4] F25B *29/00*; G05D *23/00*
U.S. Cl. 165—27 **14 Claims**



1. A thermostat controlled apparatus, comprising:

first and second thermostat units each having separate, independently setable adjustable temperature setting means and each including switching means responsive to said temperature setting means and temperature measured by said thermostat unit to provide a connection between a common terminal and a first terminal for a temperature below a temperature set and between said common terminal and a second terminal for a temperature above said temperature set, said first and second thermostat units being adjusted to selected different temperatures to establish a range of operating conditions, said separate adjustable temperature setting means taking the form of a temperature selection control which may be turned to a selected temperature, includes indicia for indicating the temperature selected and whose operation is unique to said first and second thermostat unit associated therewith;

means for supplying energizing potential to said common terminal at one of said first and second thermostat units;

means for interconnecting said second terminal at said one of said first and second thermostat units to said common terminal at another of said first and second thermostat units;

first means connected to said first terminal at said one of said first and second thermostat units for applying said energizing potential to a first load when temperature measured is below a temperature setting selected at said one of said first and second thermostat units;

second means connected to said second terminal at said another of said first and second thermostat units for applying said energizing potential to a second load where temperature measured is above a temperature setting selected at said another of said first and second thermostat units; and

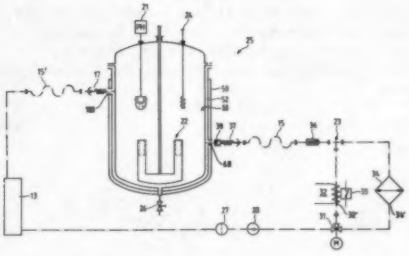
said switching means at said first and second thermostat units and said means for interconnecting acting to prevent energizing potential from being applied to said first and second means when said temperature is intermediate said selected different temperatures, and from being applied to said first and second means at the same time regardless of the temperature, said first and second means taking the form of electrical outlets to which said first and second loads may be connected with standard line cord connectors.

4,687,051

TEMPERATURE REGULATING DEVICE FOR A LABORATORY REACTION VESSEL ARRANGEMENT

Georg Zemp, Zürich, Switzerland, assignor to Contraves AG, Zürich, Switzerland

Filed Aug. 26, 1985, Ser. No. 769,453
Claims priority, application Switzerland, Sep. 7, 1984, 4278/84
Int. Cl.[4] F25B *29/00*
U.S. Cl. 165—61 **6 Claims**



1. A temperature regulating apparatus for a laboratory reaction vessel arrangement, comprising:

conduit means defining a fluid circuit;

a source of thermal energy connected to said conduit means;

a sink for thermal energy connected to said conduit means in parallel with said source;

said conduit means including a T-junction connected in series with said source and in series with said sink;

a mixing device connected to said conduit means directly in series with that T-junction;

a reaction vessel having a substantially vertical axis and a substantially cylindrical wall;

a substantially annular thermal chamber for a fluid heat exchange medium at least partially surrounding said substantially cylindrical wall of said reaction vessel;

said thermal chamber being provided with an inlet aperture for admitting said fluid heat exchange medium from said conduit means into said thermal chamber;

a nozzle connected to said conduit means and situated in said inlet aperture;

said source, said sink, said T-junction and said mixing device being connected to said conduit means upstream of said nozzle;

said nozzle having an outlet end for injecting said fluid heat exchange medium into said substantially annular thermal chamber such that a finely turbulent unidirectional flow is generated;

said nozzle having a longitudinal axis extending substantially tangential to said substantially cylindrical wall of said reaction vessel such that said cylindrical wall serves as an impact surface for said finely turbulent unidirectional flow

for efficient heat exchange between said fluid heat exchange medium and said reaction vessel; and

said nozzle being arranged to inject said fluid heat exchange medium as said finely turbulent unidirectional flow into said substantially annular thermal chamber and directly at said substantially cylindrical wall substantially along a tangent thereto, and at an upward inclination with respect to the axis of the reaction vessel defining a helix angle of fluid flow for imparting a helical motion to said finely turbulent unidirectional flow within said substantially annular thermal chamber.

4,687,052

SUPPORT SYSTEM FOR COILED TUBE BUNCH OF A HEAT EXCHANGER

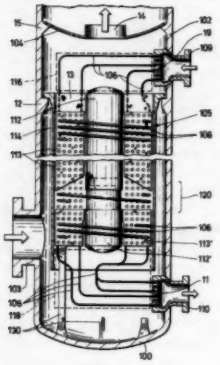
Hans Fricker, Rickenbach-Attikon, Switzerland, assignor to Sulzer-Ruti Machinery Work Ltd., Ruti, Switzerland

Filed Aug. 19, 1985, Ser. No. 766,929

Claims priority, application Switzerland, Aug. 21, 1984, 3999/84

Int. Cl.[4] F28D *7/02*

U.S. Cl. 165—82 **12 Claims**



6. A heat exchanger comprising

a pressure vessel defining a flow path for a flowable medium;

a tube bunch disposed within said flow path in said pressure vessel, said tube bunch having a plurality of tubes disposed helically about a central axis of said pressure vessel; and

a support system within said pressure vessel for supporting said tube bunch therein, said system including two groups of support plates disposed in axially spaced ralation to define a plate-free expansion zone therebetween with each group secured in said pressure vessel at ends opposite each other and a displacement member disposed on said axis of said pressure vessel, said member having a pair of coaxial parts slidably mounted in telescopic relation with each other, one of said parts being secured to one of said groups of support plates and the other of said parts being secured to the other of said groups of support plates.

4,687,053

HEAT EXCHANGER PANEL AND MANUFACTURING METHOD THEREOF

Manfred Paulus, Pforzheim, and Norbert Frömel, Eisingen, both of Fed. Rep. of Germany, assignors to Fr. Kammerer GmbH, Pforzheim, Fed. Rep. of Germany

PCT No. PCT/EP83/00313, § 371 Date Jul. 26, 1984, § 102(e) Date Jul. 26, 1984, PCT Pub. No. WO84/02178, PCT Pub. Date Jun. 7, 1984

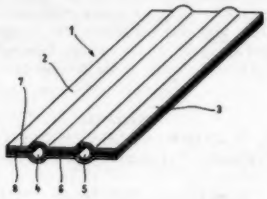
PCT Filed Nov. 23, 1983, Ser. No. 637,224

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1982, 3243713

The portion of the term of this patent subsequent to Dec. 27, 2000, has been disclaimed.

Int. Cl.[4] F28F *13/18*

U.S. Cl. 165—133 **21 Claims**



1. Heat exchange panel comprised of two selectively clad metal plates and at least one channel disposed between these plates for a liquid or gaseous medium flowing therein to be warmed or cooled, wherein the plates are made of a material which can be cold roll bonded only with difficulty or not at all when using conventional cladding processes, and an adhesive layer made of an amorphous metal is provided between the two plates and on both sides of and in proximity to said at least one channel, the plates being permanently joined together by cold roll bonding in the area of the adhesive layer.

4,687,054

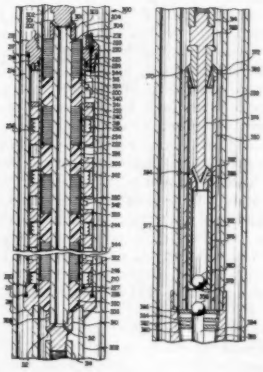
LINEAR ELECTRIC MOTOR FOR DOWNHOLE USE

George W. Russell, Rte. 1, Box 164A, and Larry B. Underwood, 1309 Henderson, both of Bridgeport, Tex. 76026

Filed Mar. 21, 1985, Ser. No. 714,564

Int. Cl.[4] E21B *43/00;* **F04B** *17/04*

U.S. Cl. 166—66.4 **8 Claims**



1. In a production tubing string: a tube of non-magnetic material substantially of the same internal diameter as the tubing string; a plurality of electromagnetic coil assemblies

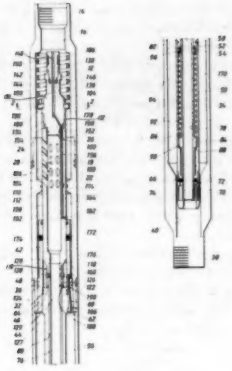
disposed about the tube and equidistantly spaced along the length thereof; each of said coil assemblies comprising a coil circumfusing said tube, a first annular pole piece circumfusing said tube and positioned above said coil, a second annular pole piece circumfusing said tube and positioned below said coil, and a sleeve of magnetic material positioned about said coil and said first and second pole pieces and coextensive with the combined length thereof, a cylindrical case coextensive with and enclosing said tube and said coil assemblies; a separate mandrel of a non-magnetic material centrally positioned in said tube and removable therefrom; said mandrel having a central bore therein to permit the passage of production fluids therethrough; a plurality of armature sections equidistantly spaced along the mandrel, said spacing being different from the spacing of the coil assemblies along said tube; said armature sections being formed as a stack of disks of a magnetic material; a plurality of annular centralizers separating said armature sections; a fishing neck on said mandrel, whereby said mandrel and the components attached thereto may be removed through the tubing string without removing said tubing and components attached thereto; and means for energizing said coil assemblies in a predetermined sequence, whereby electromagnetic attractive and repulsive forces are created between said coil assemblies and the armature sections to thereby move said mandrel longitudinally inside said tube.

4,687,055

WIRE-LINE CONTROLLED DOWN-HOLE SHUT-IN TOOL FOR WELLS

Henry H. Leggett, 38 Joo Koon Circle, Jurong, Singapore (2262)

Filed Apr. 7, 1986, Ser. No. 849,123
Int. Cl.[4] E21B *34/10*
U.S. Cl. 166—72 **17 Claims**



1. A wire-line controlled down-hole shut-in tool for wells, comprising:

(a) a mandrel adapted to form a part of a tubing string installed in a well bore and forming an elongated internal chamber;

(b) a shut-in valve mechanism being located within said mandrel and having a valve seat, a shut-in valve element supported for movement to open and closed positions relative to said valve seat and means urging said shut-in valve element toward the closed position thereof;

(c) elongated flow tube means being movably disposed within said elongated internal chamber and forming a flow passage being part of production flow passage means through said mandrel, said elongated flow tube means defining upper and lower flow tube sections each being movably disposed within said elongated internal chamber, said lower flow tube section forming a valve control portion of said flow tube means normally restraining said shut-in valve element in the open position permitting production flow through said production flow passage means, a lost-motion connection securing said upper and lower flow tube sections in relatively movable assembly, said elongated flow tube means being linearly movable in one direction within said mandrel to a shut-in position retracting said valve control portion thereof from its restraining relation with said shut-in valve element and permitting closing movement of said shut-in valve element for shutting-in the well;

(d) pressure transfer passage means communicating well pressure upstream of said shut-in valve element past the closed shut-in valve element, through said mandrel to pressure detection apparatus;

(e) means responsive to linear movement of upper flow tube section of said elongated flow tube means in the opposite direction for pressure balancing said shut-in valve element in the closed position thereof; and

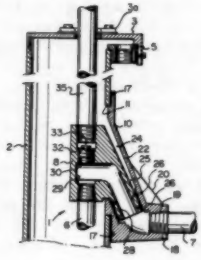
(f) after substantial pressure balancing of said valve element said valve control portion of said elongated flow tube means imparting opening movement to said shut-in valve element as said elongated flow tube means completes its linear movement in said opposite direction.

4,687,056

PITLESS ADAPTOR

Garry L. Doering, Box 1469, Olds, Alberta, Canada (T0M 1P0)

Filed Sep. 20, 1984, Ser. No. 652,684
Int. Cl.[4] E21B *33/04*
U.S. Cl. 166—88 **7 Claims**



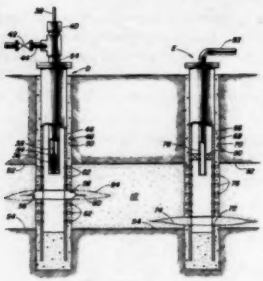
1. In a well casing having an opening in a wall of the casing, a pitless adaptor comprising body means, means mounting the body means in the casing opening, passage means extending longitudinally through said body means, the lower end of said passage means being connected in fluid communication with the upper end of a vertical drop pipe, outlet means substantially perpendicular to said passage means for carrying water from said drop pipe to a horizontal service line, the upper end of said passage means being connected with the lower end of a top pipe so as to be capable of fluid communication therewith, the top pipe extending within and to the upper end of the casing for connection to a hydrant or the like at the top of the casing, and removable plug means normally closing the upper end of said passage means, whereby water can be diverted through the upper end of said passage means and the top pipe to a hydrant or the like at the top of the casing by removal of said plug.

4,687,057

DETERMINING STEAM DISTRIBUTION

John S. Moore, Ponca City, Okla., and Farhad Ghassemi, Lafayette, La., assignors to Conoco, Inc., Ponca City, Okla.

Filed Aug. 14, 1985, Ser. No. 765,995
Int. Cl.[4] E21B *43/24*
U.S. Cl. 166—252 14 Claims



1. An enhanced oil recovery method comprising steps of:

(a) providing a pattern of wells, including at least one injection well intersecting an underground oil bearing formation for injecting steam into an area of said formation surrounding said injection well, and including a plurality of producing wells intersecting said area of said formation for producing oil and other fluids from a plurality of sectors of said area, each of said sectors being associated with one of said producing wells and defining a portion of said area to be drained by its associated producing well;

(b) injecting steam into said formation through said injection well;

(c) monitoring a salinity concentration of produced water from each of said producing wells to thus identify producing wells where salinity concentration is declining as a result of an inflow of fresh water which is condensed from injected steam;

(d) determining an instantaneous relative steam portion, of a total flow rate of steam being injected into said area, which is flowing to each of said producing wells by determining a flow rate of fresh water required to cause a salinity concentration decline measured in step (c) for each of said producing wells;

(e) comparing said instantaneous relative steam portion determined in step (d) to a predetermined preferred relative steam portion for the sector associated with each of said producing wells to determine which sectors of said area are receiving more steam than preferred and which sectors of said area are receiving less steam than preferred;

(f) then modifying a production capability of at least one of said producing wells and thus changing an instantaneous relative steam portion, of the total flow rate of steam being injected into said area, which is flowing to said at least one producing well and to at least one other of said producing wells to more closely approximate the preferred relative steam portions for the sector associated with said one producing well and said other producing well; and

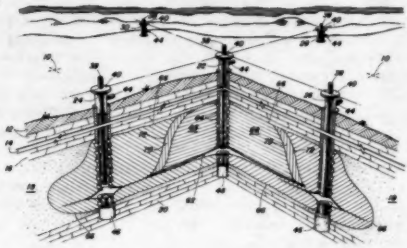
(g) thereby increasing a total volume of oil recovered as compared to the total volume of oil which would have been recovered in the absence of step (f).

4,687,058

SOLVENT ENHANCED FRACTURE-ASSISTED STEAMFLOOD PROCESS

Burton M. Casad; Yogendra Soni, and Jeff J. Jurinak, all of Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla.

Filed May 22, 1986, Ser. No. 866,488
Int. Cl.[4] E21B *43/17, 43/24, 43/40*
U.S. Cl. 166—263 85 Claims



1. A process for establishing a zone of increased fluid mobility between an injection well and a production well penetrating a subsurface formation containing heavy oil deposits, comprising:

(a) stimulating said production well by injecting a hot aqueous fluid at a temperature above 100° C. into the production well to impart heat to the formation surrounding the production well and to thereby create a preheated zone surrounding said production well;

(b) fracturing from the injection well thus providing a generally horizontal fracture system extending into a vicinity of said preheated zone;

(c) injecting a hot aqueous fluid at a temperature above 100° C. and a substantially vaporized volatile solvent into said injection well and into said fracture system, said hot aqueous fluid being injected at a very high rate and a pressure sufficient to part the fracture system for a substantial portion of a distance from said injection well to said production well while producing fluids from the production well, such as to form a heated permeable zone between the wells containing a mobilizable mixture of heavy oil and liquid solvent; and

(d) producing said mixture of heavy oil and liquid solvent from said production well, whereby a steam-to-oil ratio of said process is substantially lower than would be a steam-to-oil ratio for a similar process not including the injection of solvent in step (c).

4,687,059

ENHANCED HYDROCARBON RECOVERY PROCESS UTILIZING THERMOELASTIC FRACTURING

Prabodh Pathak, Plano; Stephen J. Salter, Dallas; Jay A. Gonzalez, Garland, and Thomas K. Perkins, Dallas, all of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

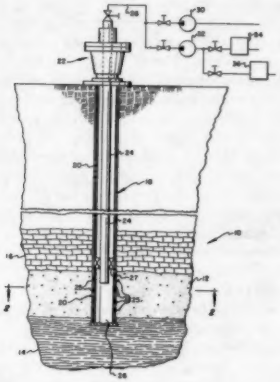
Filed Mar. 21, 1986, Ser. No. 842,517
Int. Cl.[4] E21B *36/00, 43/17*
U.S. Cl. 166—271 8 Claims

1. A method for producing hydrocarbon fluids from a subterranean formation into which at least one injection well and one production well have been drilled, respectively, said method comprising the steps of:

injecting water into said formation through said injection well to form a flood front progressing through said formation, said injection of water being at a temperature and pressure such as to preclude significant fracturing of said formation;

injecting a fluid into said formation after the injection of said water at a temperature substantially lower than the ambi-

ent temperature of said formation so as to reduce the in situ stresses in said formation, said fluid being injected at a pressure which will propagate fractures through a region



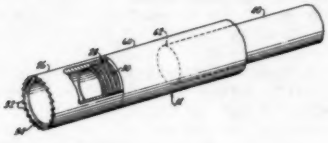
of said formation flooded by said water so as to increase the permeability thereof and the injectivity rate of said fluid for driving the flood front of said water and oil toward said at least one production well.

4,687,060

PRODUCTION AND GROUT LINER FOR METHANE DRAINAGE IN SUBTERRANEAN BOREHOLES AND METHOD

Walter L. Richards, Huntington Beach; Roger L. Henderson, Bluefield, W. Va.; George N. Aul, Richlands, Va., and Barry W. Pauley, West Blocton, Ala., assignors to Methane Drainage Ventures, Placentia, Calif.

Filed Jun. 13, 1986, Ser. No. 874,075
Int. Cl.[4] E21B *33/13*
U.S. Cl. 166—285 **6 Claims**



1. A process for recovering methane gas from subterranean coal seams using degas holes and sealing said degas holes after recovery of the methane gas in anticipation of mining of coal from the subterranean coal seam, said process comprising the steps of:

drilling a generally horizontal degas hole into a subterranean coal seam using a drill bit and drill pipe;

withdrawing the drill bit and drill pipe and thereafter replacing of the drill bit with a casing shoe;

inserting the casing shoe and drill pipe into the degas hole;

inserting the perforated liner into the borehole through the drill pipe; and,

removing the drill pipe and casing shoe while holding the perforated liner within the degas hole, said casing shoe passing on the outside of said perforated liner as it is removed;

collecting methane gas from said perforated liner, said methane gas entering the perforated liner through the perforations therein;

thereafter pumping grout down the center of the perforated liner to the end of the degas hole;

filling the end of the degas hole with grout until the end of the liner is filled with grout;

increasing the pressure of the grout within the liner to force grout through the perforations in the liner to fill the degas hole along the length thereof;

continuing to pump grout down the center of the perforated liner until the entire degas hole is filled with grout; and,

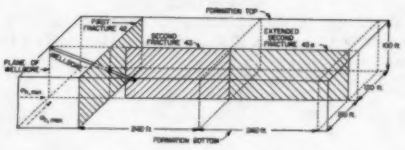
allowing the grout to set, thereby sealing the degas hole.

4,687,061

STIMULATION OF EARTH FORMATIONS SURROUNDING A DEVIATED WELLBORE BY SEQUENTIAL HYDRAULIC FRACTURING

Duane C. Uhri, Grand Prairie, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 8, 1986, Ser. No. 938,891
Int. Cl.[4] E21B *43/26*
U.S. Cl. 166—308 **8 Claims**



1. A method for the stimulation of oil and gas production from a naturally fractured earth formation surrounding a deviated wellbore by sequential hydraulic fracturing, comprising the steps of:

(a) firstly supplying fracturing fluid to said formation at a first depth within said deviated wellbore to propagate a first vertical fracture as favored by the original in-situ stresses of the formation in a direction that is perpendicular to the least principal in-situ stress, the formation of said first vertical fracture altering the local in-situ stresses, and

(b) secondly supplying fracturing fluid to said formation at a second depth within said wellbore, while maintaining pressure in the first vertical fracture, to propagate a second vertical fracture through said formation in a direction parallel to said least principal in-situ stress as favored by the altering of the local in-situ stresses by said first vertical fracture, such that said second vertical fracture intersects the naturally occurring fractures in said formation which are perpendicular to the direction of said least principal in-situ stress so as to link said naturally occurring fractures to the wellbore and thereby stimulate the production of oil or gas from said formation.

4,687,062

UNDERSEA TEMPLATE FOR THE DRILLING OF WELLS FOR THE EXPLOITATION OF HYDROCARBON POOLS UNDER THE SEA

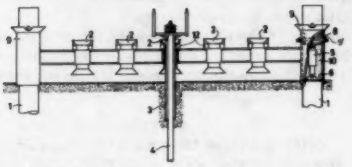
Leonardo Beghetto, Venice, and Giovanni Padovan, Arsie', both of Italy, assignors to Technomare S.p.A., Venice, Italy

Filed Apr. 13, 1984, Ser. No. 600,335
Claims priority, application Italy, Apr. 18, 1983, 84110 A/83
Int. Cl.[4] E21B *33/047*
U.S. Cl. 166—366 **4 Claims**

1. An undersea template for the drilling of wells for the exploitation of marine hydrocarbon pools which comprises

a template having variable dimensions and containing sleeves at the end portions thereof as well as a plurality of intermediate guiding tubes, through which anchorage columns and production columns for wells are to be drilled, said intermediate guiding tubes being disposed intermediate said sleeves and spaced apart in any desired configuration,

mooring piles telescopically extending through said sleeves for anchoring the template to the seabed, and a



flexible member disposed between the template and the intermediate guiding tubes or between the sleeve and the mooring piles whereby the weight bearing on the template is the sole weight of the anchorage columns.

4,687,063

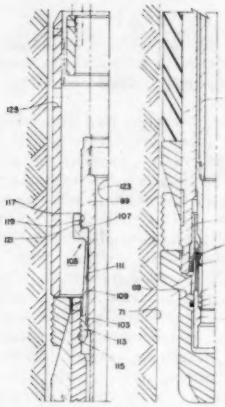
WELL CEMENTING METHOD AND APPARATUS

Bruce Gilbert, Houston, Tex., assignor to Hughes Tool Company, Houston, Tex.

Filed Dec. 16, 1985, Ser. No. 809,354

Int. Cl.[4] F21B *23/06, 33/129*

U.S. Cl. 166—382 **7 Claims**



1. A fluid slurry retaining apparatus for use on a wireline setting tool in a well, the setting tool being of the type having a power actuated outer sleeve and a cooperating inner tubular member, comprising:

a retainer having external gripping and sealing means engageable with the setting tool outer sleeve for gripping and sealing the surrounding well bore upon opposite relative movement of the setting tool outer sleeve and cooperating inner tubular member to seal off a lower region of the well from an upper annular region, the retainer having a solid lower extent with an open interior and a plurality of ports which communicate the interior of the retainer with the lower well region;

a sliding valve located within the lower extent of the retainer, the sliding valve comprising a collect body and upwardly extending collect fingers, the valve being slidable between an open position in which the ports communicate the interior of the retainer with the lower well region and a closed position in which the collect body closes off communication through the ports;

an inner body initially received within the interior of the retainer, the inner body having an upper end engageable with the setting tool inner cooperating member and having a plurality of openings at a lower end thereof which are alignable with the ports of the retainer when the sliding valve is in the open position, the upper end having an exterior surface with an external ramp area formed in a portion of the exterior; and

a collect latch initially securing the inner body within the retainer with the body openings aligned with the ports to allow circulation of well fluids through the ports and through the interior of the apparatus as the apparatus is being run to the desired setting depth within the well bore, the collet latch having a collet body and a plurality of expansive collet fingers depending therefrom, the collet latch being slidably received about the exterior surface of the inner body with the ramp area beneath the collect fingers to expand the fingers outwardly with respect to the inner body, the collet fingers being provided with outer threaded surfaces adapted to engage a mating internally threaded surface of the retainer, the collect latch being provided in a collapsible position and being forcibly expanded to the proper thread diameter for engaging the retainer internally threaded surface by forcing the collet fingers over the ramp area.

5. A method of setting a cement retainer on a wireline actuated setting tool having a power actuated outer sleeve and a cooperating inner tubular member, the cement retainer having external gripping and sealing means which are actuated by the outer sleeve of the setting tool for sealing off a lower region of the well below the sealing means for cementing, the method comprising the steps of:

providing the cement retainer with a plurality of cementing ports which communicate the interior of the retainer with the lower well region;

positioning a sliding valve within a lower extent of the retainer, the valve being slidable between an open position in which the cementing ports communicate the interior of the retainer with the lower well region and a closed position;

providing an inner body within the cement retainer having upper connecting means which are engageable with the setting tool inner tubular member, the inner body being provided with a plurality of openings at a lower end thereof which are alignable with the cementing ports when the sliding valve is in the open position;

latching the inner body within the retainer with frangible latch means so that the inner body openings are aligned with the cementing ports and the sliding valve is in the open position; and

running the cement retainer to the desired depth within the well on the wireline setting tool while allowing circulation of well fluids through the cementing ports, through the sliding valve and the inner body openings, and upwardly and out of the cementing retainer to facilitate running the retainer to the desired depth.

4,687,064

GREEN PEANUT HARVESTER

Reaves Johnson, Smithville, Ga., assignor to RJM, Inc., Ocala, Fla.

Filed Mar. 24, 1986, Ser. No. 843,133

Int. Cl.[4] A01D *29/00, 46/00;* **A23N** *15/02*

U.S. Cl. 171—27 **16 Claims**

1. A harvester having harvesting means for unearthing green peanut plants from a peanut bed and having means for picking green peanuts from a root structure of said plants; said harvester having a longitudinally disposed continuous conveyor belt having a pair of opposed belts for carrying unearthed peanut plants;

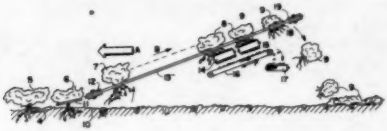
said means for picking peanuts being disposed below and adjacent a rearward end of said conveyor belt for picking peanuts from a root structure of such unearthed plants, said picking means having:

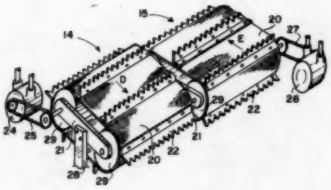
(i) first and second picking elements disposed in tandem relationship, said first element having a flat belt moving

in a first direction transverse to said conveyor belt and said second element having a flat belt moving in the opposite transverse direction,

(ii) each of said flat belts disposed on a pair of rotatable drums having parallel axes,

(iii) each of said flat belts having a plurality of saw-tooth like picking combs attached to the surface thereof, and





(iv) a shield disposed around each of said flat belts in the direction of movement thereof and slightly apart from said picking combs for guiding said root structure into said picking combs and for guiding the movement of picked peanuts.

4,687,065

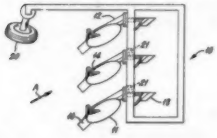
SOIL-INVERSION CULTIVATOR

Richard E. Cope, Bedford, and Hugh G. Stirling, London, both of England, assignors to National Research Development Corporation, London, England

Filed Dec. 17, 1984, Ser. No. 682,254

Int. Cl.[4] A01B *5/04, 15/16*

U.S. Cl. 172—167 **15 Claims**



1. A cultivator having an array of laterally-spaced soil-inverting units, each soil-inverting unit comprising a plough-type body having a plowshare and a mouldboard to begin inversion of laterally spaced strips of soil, a respective concave ground-driven soil-inversion disc spaced laterally and rearwardly from each said mouldboards working at a similar depth to the plough-type body and inclined to vertical and when viewed in plan, also to a longitudinal plane of each unit so as, in operation, to lift both deposited soil partially inverted by the plough-type body and the unmoved strip of soil beneath the deposited soil, and respective generally planar deflector means following the disc and arranged to complete the soil-inversion process across the entire width of soil defined by said array of units.

4,687,066

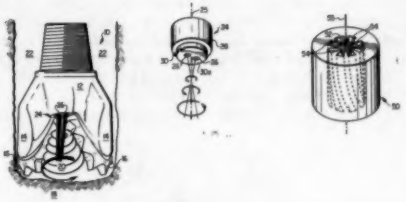
ROCK BIT CIRCULATION NOZZLE

Robert F. Evans, Dallas, Tex., assignor to Varel Manufacturing Company, Dallas, Tex.

Filed Jan. 15, 1986, Ser. No. 819,031

Int. Cl.[4] E21B *10/18*

U.S. Cl. 175—340 **8 Claims**



1. A drill bit having a body with a central axis, at least one cutting face, and a means for containing drilling fluid in the body of the drill bit, the improvement comprising:

a nozzle mounted on the central axis of the drill bit body for ejecting the drilling fluid from the body of the drill bit into the space at the bottom of a bore hole to thereby cause the drilling fluid to form a downwardly directed vortex in the space above the bottom of the bore hole and to sweep cuttings away from the cutting face of the drill bit, said nozzle comprising a base having at least two outlets formed therethrough, each of said outlets having a center axis directed at an angle skew to the center axis of each of the other outlets and to the central axis of the body and the center axis of each outlet having a partial horizontal component radially directed toward and skew to the central axis of the body.

8. A drill bit having a body with a central axis, at least one cutting face, and a means for containing drilling fluid in the body of the drill bit, the improvement comprising:

a nozzle mounted on the central axis of the drill bit body for ejecting the drilling fluid from the body of the drill bit into the space at the bottom of a bore hole to thereby cause the drilling fluid to form a downwardly directed vortex in the space above the bottom of the bore hole to sweep cuttings away from the cutting face of the drill bit, said nozzle including:

a base having a central axis;

a bore down the central axis of the base; and

a plurality of helical grooves formed along the outer surface of the bore for imparting angular momentum to a portion of said drilling fluid, wherein the width of each of said grooves is greater at the edge of the groove toward the outer circumference of the nozzle than at the intersection of the groove and the outer surface of the bore.

4,687,067

CROSSFLOW ROTARY CONE ROCK BIT WITH EXTENDED NOZZLES

Richard D. Smith, Lakewood, Calif.; Michael S. Oliver, Lafayette, La.; Richard D. Crouse, Huntington Beach, and Weng-Kwen R. Chia, Irvine, both of Calif., assignors to Smith International, Inc., Newport Beach, Calif.

Filed May 1, 1986, Ser. No. 858,487

Int. Cl.[4] E21B *10/18*

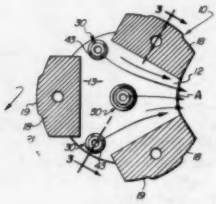
U.S. Cl. 175—340 **9 Claims**

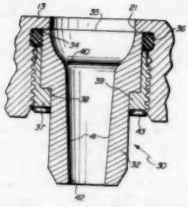
1. A rotary cone rock bit for use in an earth formation, the rock bit being run with hydraulic fluid, the rock bit comprising:

a rock bit body having a first open pin end adapted to be connected to a drillstring and a second cutting end, said second cutting end consisting of three rotary cones rotatively retained on journal bearings extending from three

120° rock bit leg segments connected to a dome portion formed by said bit body, said bit body further forming a chamber therein for receiving said hydraulic fluid, said chamber is in fluid communication with said first open pin end; and

a pair of mini-extended nozzles, each of said nozzles forming a first entrance end and a second exit end, said nozzles are connected to a dome portion formed by said bit body, said first entrance end of each of said nozzles being in fluid communication with said chamber, each mini-extended nozzle is positioned in said dome portion of said rock bit between two of the three 120° leg segments to direct said hydraulic fluid across said cutting end of said rock bit, a nozzle passage profile formed by each of said mini-extended nozzles define a streamlined entry transition sat





said first nozzle entrance end from said dome portion to said entrance end, and a streamlined nozzle throat portion nearest said first nozzle entrance end, said passage further extends from said streamlined throat portion to said second nozzle exit end, said nozzle passage profile is adapted to accelerate hydraulic fluid therethrough to lift cuttings from a bottom of a borehole sweeping said cuttings across said second cutting end and to minimize cavitation and pressure losses associated with the extended portion of each of said mini-extended nozzles, said pair of mini-extended nozzles have sufficient length to create an area of low energy hydraulic fluid bounded on one side by said rock bit dome and limited by a plane established by the discharge fluid from an end of said nozzles, allowing free movement of detritus from said dome to a borehole cut by said rock bit.

4,687,068

INVALID'S WHEELCHAIR AND LIKE CONVEYANCES

Jeffery M. Pagett, New South Wales, Australia, assignor to Australian Transcenders International Pty. Ltd., Australia

Continuation of Ser. No. 461,654, Jan. 27, 1983, Pat. No. 4,564,080. This application Dec. 30, 1985, Ser. No. 814,858

Int. Cl.[4] B62D *55/04*

U.S. Cl. 180—8.2 **12 Claims**

1. Mobile apparatus comprising:

a central support;

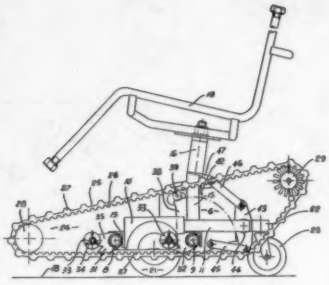
a pair of side supports on respective side of the central support;

means pivotally mounting the central support on each side support, respectively, said mounting means allowing the central support and each side support to move relative to each other;

means coupled with the supports for moving the side supports relative to the central support from first positions to second position and return;

wheel means engageable with a supporting surface and coupled to the central support for supporting the same for movement over said surface when the side supports are in said first positions;

means carried by the central support for driving said wheel means;



an endless flexible track for each side support, respectively, each track being mounted on the respective side support and being movable into engagement with said surface for supporting said central support for movement over said surface when the side supports are in said second positions; and

means coupled with each track, respectively, for moving the track relative to the respective side support, said tracks being out of engagement with the surface when the side supports are in the first positions and the wheel means being out of engagement with said surface when the side supports are in said second positions.

4,687,069

COOLING STRUCTURE FOR AN ENGINE IN A STRADDLED TYPE VEHICLE

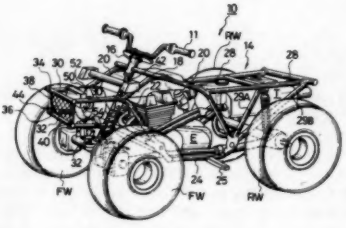
Fumio Inomata, Asaka, and Tooru Iwadate, Tokyo, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 4, 1986, Ser. No. 848,061

Claims priority, application Japan, May 1, 1985, 60-64234[U]

Int. Cl.[4] B60K *11/04*

U.S. Cl. 180—68.2 **8 Claims**



1. A cooling structure for an engine in a dune buggy type vehicle provided with steerable left and right front wheels and an engine positioned at the center in a slanted direction to a vehicle body such as a four-wheel buggy car, said cooling structure comprising:

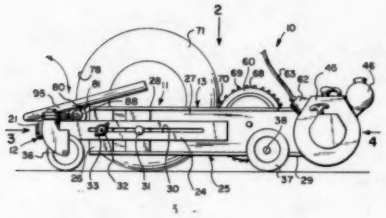
a cooling fan disposed in front of said engine;
an oil cooler engine radiator disposed adjacent to an upper half section of said cooling fan; and
a pair of left and right upper frame members and a pair of left and right lower frame members extended in front of a handle rotary shaft from a vehicle body frame supporting said engine, at least a principal part of said oil cooler engine radiator being disposed within a space surrounded by said four frame members.

4,687,070

AUTOMOBILE MANEUVERING DEVICE

Russell Ricciardi, 1420 5th Ave., Bay Shore, N.Y. 11706

Filed Aug. 6, 1986, Ser. No. 893,715
Int. Cl.[4] B60P *3/06*
U.S. Cl. 180—74 **12 Claims**



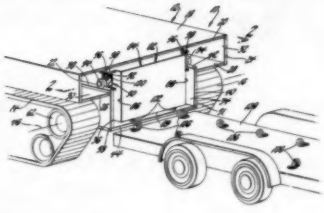
1. An automobile maneuvering device comprising:
a chassis comprising transport wheels for permitting movement of the device along the ground,
a drive wheel operably rotatably connected to the chassis, and means for rotating the drive wheel, clamp means operably connected to the chassis and spaced from and opposed to the drive wheel, said chassis including means to move the clamp means to engage one portion of an automobile tire with the drive wheel engaged at another portion of the automobile tire, and means to actuate the rotating means, so that with rotation of the drive wheel the automobile tire is rotated and the automobile and device moved along the ground.

4,687,071

MOUNTING FOR TRACK LAYING VEHICLE TRANSMISSION

James F. Hartz; Rayman E. Bazilio, both of Indianapolis, and Michael R. Ferguson, Brownsburg, all of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed May 27, 1986, Ser. No. 867,222
Int. Cl.[4] B60K *17/00*
U.S. Cl. 180—9.1 **7 Claims**



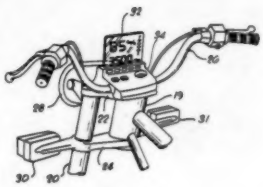
1. In a track laying vehicle including
a hull having a compartment therein defined on opposite sides by a pair of laterally spaced vertical hull walls and a fore and aft access to said compartment,
means on each said hull walls defining an aperture therein aligned on a transverse sprocket axis of said hull,
a transmission having a case with a pair of vertical sides and a transverse axis perpendicular to said sides, and
means for translating said transmission longitudinally through said fore and aft access into and out of said compartment and for temporarily supporting said transmission in an installed position in said compartment wherein said sprocket axis and said transverse axis coincide and each of said transmission case vertical sides is adjacent a corresponding one of said vertical hull walls,
a transmission mounting comprising:
a pair of web adapters each rigidly attached to a corresponding one of said vertical hull walls in a corresponding one of said hull wall apertures,
means on each of said web adapters defining a cylindrical pilot surface in a corresponding one of said hull wall apertures aligned on said sprocket axis,
means on said transmission case defining a cylindrical boss on each of said transmission case vertical sides aligned on said transverse axis of said transmission,
a pair of collars slidably disposed on respective ones of said bosses for bodily shiftable movement between laterally inboard retracted positions and laterally outboard extended positions, and
means on each of said collars defining a cylindrical bearing surface engageable on the corresponding one of said cylindrical pilot surfaces in said installed position of said transmission and said extended positions of said collars whereby said transmission is supported on said vertical hull walls at said coincident transverse and sprocket axes when said temporary support is removed.

4,687,072

INSTRUMENT DISPLAY SYSTEM

Katsusuke Komuro, Tokyo, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 520,019, Aug. 3, 1983, abandoned. This application Jan. 7, 1986, Ser. No. 817,787
Claims priority, application Japan, Aug. 9, 1982, 57-138238; Aug. 13, 1982, 57-141530; Aug. 13, 1982, 57-123560[U]; Aug. 13, 1982, 57-141529
Int. Cl.[4] B60Q *3/04;* **G09F** *9/35*
U.S. Cl. 180—219 **13 Claims**



1. A display system for a motorcycle having a vehicle body front including a steering handle system, comprising
a liquid crystal display unit comprising a plate element and having a lower end;
said steering handle system comprising a handle cover mounted on a steering handle;
said lower end being installed on said handle cover in front of said steering handle, said liquid crystal display unit being in an upright position extending into the field of view of the motorcycle operator;
said liquid crystal display unit and said plate element being transparent, providing an unobstructed view forwardly of the motorcycle for observation therethrough by the motorcycle operation; and
a control unit mounted on said motorcycle separated from said plate element and being under said handle cover adjacent the center of the steering handle; and

an electrical connection between said plate element and said control unit.

4,687,073

HYDRAULICALLY ELEVATABLE ACCESS EQUIPMENT

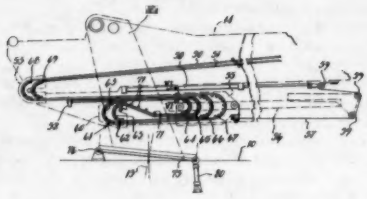
Denis H. Ashworth, Womborne, England, assignor to Simon Engineering Dudley Limited, West Midlands, England

Filed Jul. 26, 1984, Ser. No. 634,587

Claims priority, application United Kingdom, Jul. 30, 1983, 8320618; Apr. 18, 1984, 8410160

Int. Cl.[4] B66F *11/04*

U.S. Cl. 182—2 **15 Claims**



1. Access equipment including a boom mounted on a supporting structure and consisting of a first section and at least one further section telescopically extendible relative thereto; at least two sets of side-by-side conduits with one set superimposed above the other, the conduits being anchored at one end with respect to the first section and extendible with said extendible section, a take-up system for maintaining the conduits taut for all positions of said extendible section, there being, at a location, pully means around which said conduits pass and comprising at least two groups of rollers, each group having parallel roller axes displaced around an arcuate path so as to present a curved supporting surface for an associated set of conduits.

4,687,074

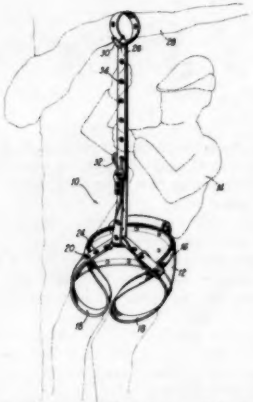
TREE HARNESS

James W. Green, 95 W. Crossville Rd., Roswell, Ga. 30075

Filed Oct. 21, 1985, Ser. No. 789,378

Int. Cl.[4] A63B *29/02*

U.S. Cl. 182—3 **7 Claims**



1. A tree harness for suspending a wearer's body from a tree comprising:

a flexible seat which supports the body at about the center of gravity, the seat having a top edge, bottom edge, two side edges, two top corners, and two bottom corners;

an adjustable belt extending between the two top corners of the seat;

a pair of leg straps attached to the seat for engaging the wearer's thighs, each strap being formed by extending a strip of flexible material from the top corner of one side edge to the bottom corner of the same side edge; and

a detachable adjustable strap means having one end attached to the belt and the other end adapted to secure the flexible seat to the tree.

4,687,075

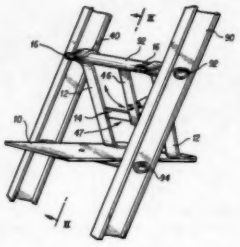
LOCKING SAFETY PLATFORM FOR A LADDER

Jerry W. Skaggs, P.O. Box 67, Malden, W. Va. 25306

Filed Feb. 13, 1987, Ser. No. 14,857

Int. Cl.[4] E06C *7/16*

U.S. Cl. 182—121 **7 Claims**



1. A safety platform for attachment to a ladder comprising:

a foot platform supported by one rung of a ladder in a horizontal position, said platform having a leveling means on the bottom thereof to prevent forward movement when weight is applied to the platform;

support brackets attached to the rear of said platform at the sides thereof and extending at an acute angle to the proximate front midpoint of the next higher rung of the ladder, said brackets terminating in a horizontal plane;

a horizontal cross-brace connecting the support brackets at the proximate midpoints thereof;

hinge members at each upper end of the support brackets;

arcuate support members attached to said hinge members for engagement with the upper rung of the ladder, each of said arcuate support members terminating in a vertical leg;

a cross-member attached to the vertical legs of said support members so that the hinge members operate together;

a locking arm pivotably attached at the midpoint of said cross-member for engagement with the front of the cross-brace connecting the support brackets, said locking arm having a rearward spring action so that force is required to move it forward to clear the cross-brace before the locking arm can be moved into a vertical position for engagement with the cross-brace.

4,687,076

SEGMENT CONNECTOR FOR MODULAR LADDER

Nan-Hsing Tu, No. 11, Lane 116, Sec. 3, Fu Hsing Rd., Taichung, Taiwan

Filed Oct. 17, 1986, Ser. No. 920,586

Int. Cl.[4] E06C *1/10*

U.S. Cl. 182—178 **7 Claims**

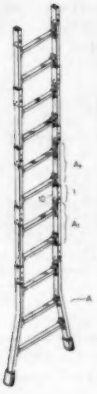
1. A segment connector to connect two segments of a modular ladder which have through holes near ends of the segments, including:

a connector housing having a top open end and a bottom open end and a side wall, the side wall having rivet holes and a hook hole means, the connector housing being

sleeved partially over one of the two segments through one of the top and bottom open ends;

a rivet insertable through the rivet holes in the connector housing and the sleeved segment to pass completely therethrough to fix the connector housing sleevedly on the segment;

a hook means rotatably mounted on the rivet inside the connector housing and the segment, the hook means including a releasing button means; and a spring means having two ends, wound around the rivet and connected to the hook means to bias the hook means to project out of the connector housing through the hook hole means;



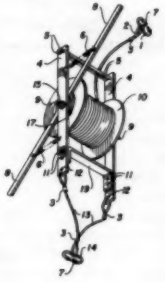
wherein, when the connector is further sleeved on the other of the two segments through the other of the top and bottom open ends, the hook means normally is biased to pass through the hole of the segment and to project out of the connector housing through the hook hole means, whereby the segments and said connector are firmly engaged together, said releasing button means further acting against the biasing action of said spring means when pressed, releasing said hook means from said holes, and said segments and said connector from said engagement.

4,687,077

PORTABLE MANUALLY OPERATED RESCUE AND LOWERING CABLE

John H. Bobick, 6822 Dawson St., Vancouver, BC, Canada V5S 2W3

Filed Mar. 31, 1986, Ser. No. 846,349
Int. Cl.[4] A62B *1/10*
U.S. Cl. 182—235 **1 Claim**



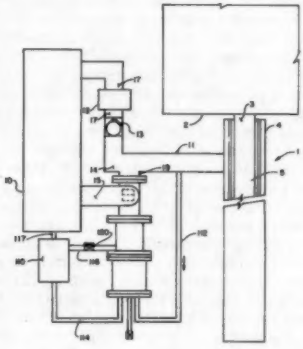
1. A portable manually operated rescue and lowering cable device for emergency descent from a building comprising in combination, a cable the free end of which is adapted to be secured at the point of origin of the descent, a coaster brake bicycle hub assembly with its hub flanges extended so as to provide a reel upon which the said cable is wound, the said hub assembly being fitted with a brake securing and releasing lever in place of the sprocket so as to realize hand-activated braking action, a metal frame in the side bars of which the said hub assembly is journaled, comprising the said pair of said bars which are rigidly held in place with a metal bar at one extremity and at the opposite with two guide bolts between which the free cable-end passes, a sling support cable secured to the ends of the said frame distant from the said guide bolts for attachment to a body sling for self-descent by the said device operator or for attachment at the point of origin from where another person or object may be lowered by an operator located at the said point of origin, a pair of springs attached at one end to the said frame and at the other to the said lever to prevent the said reel from turning till the operator of the said device desires descent and with his hands applies clockwise brake releasing force to the said lever, the amount of said releasing force being applied varying with the rate of descent speed desired.

4,687,078

HYDRAULIC ELEVATOR SYSTEM

Chester K. Wilson, 1302 Turtle Cove, Manchester, Mo. 63011

Filed Jun. 23, 1986, Ser. No. 877,157
Int. Cl.[4] B66B *11/04*
U.S. Cl. 187—17 **7 Claims**



1. In a hydraulic elevator system including a hydraulic cylinder, a ram slidably mounted in said cylinder and extending from an open upper end of said cylinder to support an elevator car, a reservoir of hydraulic fluid communicating with said cylinder, fluid pressure means operatively connected to supply hydraulic fluid under pressure from said reservoir to said cylinder to cause said ram to move upwardly in said cylinder, and valve means connected to exhaust fluid under pressure from said cylinder to said reservoir, a control valve assembly for controlling the descent of said elevator car comprising an exhaust orifice communicating with fluid in said hydraulic cylinder, orifice piston means for selectively closing and opening said orifice, means responsive to pressure of said fluid for limiting the amount by which said orifice piston means opens said orifice, said responsive means comprising a computer piston moved to orifice closing position by said fluid and biasing means of biasing said computer piston in a direction away from orifice closing position, and a control cylinder, a control piston in said control cylinder operatively connected to said orifice piston, a rod carried by said computer piston and extending slidably into said control cylinder, and a computer line communicating with said hydraulic cylinder fluid and said computer cylinder, whereby the hydraulic cylinder fluid under pressure moves said computer piston in response to said pres-

sure, to move said rod to limit the movement of said control piston.

4,687,079

DEFORMABLE LOAD SUPPORT MEMBER HAVING A TRANSVERSELY STIFF CORE

Herbert E. Gladish, Ottawa, Canada, assignor to E. B. Eddy Forest Products, Ltd., Ottawa, Canada

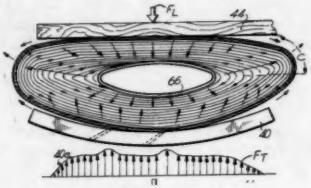
Continuation of Ser. No. 620,183, Jun. 13, 1984, abandoned, which is a division of Ser. No. 947,435, Oct. 2, 1978, Pat. No. 4,489,825. This application Feb. 13, 1986, Ser. No. 829,478

Claims priority, application Canada, Oct. 19, 1977, 288996

The portion of the term of this patent subsequent to Apr. 1, 2003, has been disclaimed.

Int. Cl.[4] F16F *9/30*

U.S. Cl. 188—268 **7 Claims**



1. An elongated support member for positioning between a load and a transversely concavely curved support surface, said member being adapted to uniformly support said load over the length of said member, comprising: a longitudinally extending peripherally closed outer member formed of a semi-rigid material capable of limited deformation under load and of substantial recovery after load removal; a resilient filler material substantially filling the interior of said outer member, said filler material being capable of limited deformation under load and of substantial recovery after load removal, said filler material comprising a continuous web of cellulosic material; and a hollow core member extending longitudinally of said support member, said filler material being wound on said core member prior to containment thereof within said outer member, said core member having substantially greater width than height in cross sectional configuration after containment in said outer member when said support member is in an unloaded state thereby having its greatest stiffness is a horizontal, transverse direction and assisting to place the portion of said filler material therebelow in tension when said support member is under load transverse to the axis of elongation of said support member.

4,687,080

CLUTCH BRAKE METHOD

Yeon K. Kim, 243-17 (12/4) Huksukdong, Dongjak-Ku, Seoul, Rep. of Korea (151)

PCT No. PCT/KR85/00015, § 371 Date Mar. 25, 1986, § 102(e) Date Aug. 25, 1986, PCT Pub. No. WO86/01163, PCT Pub. Date Feb. 27, 1986

PCT Filed Jun. 27, 1985, Ser. No. 860,221

Claims priority, application Rep. of Korea, Aug. 10, 1984, 84-4781

Int. Cl.[4] B60K *41/24, 41/28*

U.S. Cl. 192—13 A **9 Claims**

1. A clutch actuated brake device, for use on a vehicle having a fluid operated brake system and a separate clutch actuator for engaging and disengaging the clutch, comprising:

a housing member;

a cylinder in said housing;

a control piston slidably mounted in said cylinder for movement between a braking position and a non-braking position;

means for connecting said control piston to said clutch actuator for displacing said control piston from said non-braking position to said braking position when said clutch actuator is moved to disengage said clutch;

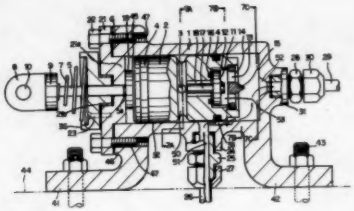
means for returning said control piston to said non-braking position when said clutch actuator is returned to the clutch-engaged position;

an inlet for brake fluid in said housing communicating with said cylinder, said brake fluid in said inlet being pressurized when the brakes are initially applied;

an outlet for said brake fluid communicating with said cylinder;

a first passage means in said housing for communicating said inlet with said outlet when said control piston is in said non-braking position;

second passage means in said control piston communicating said inlet with said outlet when said control piston is in said braking position; and



valve means in said second passage means movable by brake fluid pressure between open and closed positions for controlling transmission of pressure in the brake fluid through said second passage means;

so that when said clutch actuator is in the clutch-disengaging position and said brake fluid in said inlet is pressurized, said control piston is in said braking position and said valve means is urged by brake fluid pressure from said inlet into said open position for applying said brakes, and when said pressure in said inlet is released with said clutch actuator in the clutch-disengaging position, said valve means is moved into said closed position by brake fluid pressure from said outlet for maintaining application of the brakes by brake-pressure controlled solely by said clutch actuator.

4,687,081

LOCKING SYNCHRONIZATION FOR GEAR SHIFT

Kurt Osterloff, Friedrichshafen, and Gerd Führer, Oberteuringen, both of Fed. Rep. of Germany, assignors to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Fed. Rep. of Germany

PCT No. PCT/EP84/00314, § 371 Date Jun. 25, 1985, § 102(e) Date Jun. 25, 1985, PCT Pub. No. WO85/01998, PCT Pub. Date May 9, 1985

PCT Filed Oct. 9, 1984, Ser. No. 751,741

Claims priority, application Luxembourg, Oct. 26, 1983, 83110691.9

Int. Cl.[4] F16D *23/06*

U.S. Cl. 192—53 F **6 Claims**

1. A lock synchronizer for a gear shift, comprising:

a shaft rotatable about an axis;

a gear rotatable about said axis relative to said shaft;

a synchronizing body entrained with said shaft and positioned next to said gear;

a sliding sleeve surrounding said synchronizing body and formed with internal coupling teeth axially engageable with external coupling teeth provided on said gear;

a plurality of pressure pins between said synchronizing body and said sliding sleeve for coupling said synchronizing body to said sliding sleeve, said pins being braced resiliently between said sleeve and said body with generally

radial pressure and being tiltable in a direction of said axis upon shifting of said sliding sleeve from a neutral position in which said internal coupling teeth of said sleeve are out of engagement with said external coupling teeth provided on said gear into an intermediate position wherein said internal coupling teeth approach but do not engage said external coupling teeth, said sleeve being shiftable axially relative to said pins beyond said intermediate position into a fully coupled position in which internal coupling teeth of said sleeve are in engagement with said external coupling teeth provided on said gear;

at least one synchronizing ring traversed by and displaceable with said pins located between said sleeve and said body, said synchronizing ring having blocking teeth frictionally engageable laterally with said internal coupling teeth of said sleeve while said sleeve and said gear rotate at different speeds to retain said sleeve against displacement from said intermediate position into said fully coupled position as long as said sleeve and said gear rotate at different speeds, said frictional engagement of said blocking teeth relaxing when said sleeve and said gear rotate at the same speed to permit displacement of said sleeve into said fully coupled position; and

a friction ring surrounding said body inwardly of said sleeve and frictionally engaging said synchronizing ring while being freely displaceable relative to said body and said pins at least limitedly, said friction ring having face gearing engageable with face gearing coupled to said gear so that said friction ring is connected rotationally to said gear only when said face gearings are engaged and said friction ring is free to rotate relative to said body both in said neutral position and in said fully coupled positions of said sleeve.

4,687,082

TORQUE-SENSING CLUTCH

Lars Lenfeldt, Huskvarna, Sweden, assignor to Z-Lyften Produktion AB, Katrineholm, Sweden

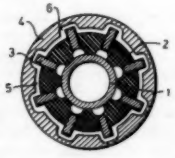
PCT No. PCT/SE85/00106, § 371 Date Oct. 22, 1985, § 102(e) Date Oct. 22, 1985, PCT Pub. No. WO85/04224, PCT Pub. Date Sep. 26, 1985

PCT Filed Mar. 8, 1985, Ser. No. 799,379

Claims priority, application Sweden, Mar. 9, 1984, 8401330

Int. Cl.[4] F16D *7/00*

U.S. Cl. 192—55 **3 Claims**



1. A torque-sensing clutch for use between two shafts or the like, comprising: two clutch halves, one half having a sleeve (4) surrounding another half and one half having means (3) normally engaging recesses (6) in another clutch half but adapted, when the torque transmitted by the clutch exceeds a predetermined limit value, to be shifted into disengagement positions, said engaging means (3) comprising a plurality of radially elongate, rigid, wear-resistant engagement members circumferentially spaced around and mounted in an elastic holder (2), said engagement members normally projecting radially from said holder and having ends spaced from bottoms of said recesses and lateral sides of said ends disposed in torque-transmitting engagement with lateral sides of said recesses (6), and being tilted out of radial orientations and into chordal disengagement positions relative to said recesses by deformation of said elastic holder upon said transmittal torque exceeding said predetermined limit.

4,687,083

LOCK UP CONTROL OF A HYDRAULIC TORQUE CONVERTER TYPE AUTOMATIC TRANSMISSION

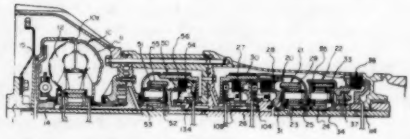
Kaoru Sotoyama; Shizuo Sumida, and Toshiyuki Kikuchi, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Mar. 22, 1984, Ser. No. 592,362

Claims priority, application Japan, Mar. 24, 1983, 58-49572

Int. Cl.[4] F16H *45/02*; B60K *41/02*

U.S. Cl. 192—0.076 **8 Claims**



1. A motor vehicle including

an engine having an engine output shaft,

a torque converter having an input member and an output member, the input member of the torque converter being connected with the engine output member to be driven thereby,

lock-up means adapted for connecting said input and output members of said torque converter, said lock-up means having means for actuating said lock-up means into and out of engagement,

speed detecting means for detecting rotating speed related to rotating speed of one of said input and output members of the torque converter and producing a speed signal,

engine load detecting means for detecting engine load and producing a load signal,

lock-up control means including means for defining first lock-up control lines as a function of the engine load and said rotating speed to define a lock-up zone as an area where the rotating speed is higher than a rotating speed value determined by the first lock-up control lines at a given engine load, and second lock-up control lines defined as a function of the engine load and said rotating speed and which increase as a function of increasing engine load and increasing rotating speed and which are each determined substantially along a zero engine output torque line where there is substantially no torque transfer between said engine output shaft and said output member of the torque converter, said lock-up zone defining an area where the engine load is greater than zero,

means for comparing an engine operating condition as obtained by said speed signal and said load signal with said first and second lock-up control lines, and

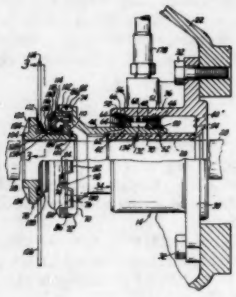
means for producing a lock-up release signal which is applied to said lock-up means to disengage said lock-up means when the engine operating condition is out of the lock-up zone.

4,687,084

CLUTCH RELEASE APPARATUS FOR PULL TYPE CLUTCHES

Keith V. Leigh-Monstevens, Troy; David L. Wrobleski, Fraser; Richard A. Nix, Utica, and Mark W. Rei, Royal Oak, all of Mich., assignors to Automotive Products plc, Warwickshire, England

Filed Jul. 22, 1985, Ser. No. 757,799
Int. Cl.[4] F16D *25/08, 23/14*
U.S. Cl. 192—85 CA **25 Claims**



1. A clutch control apparatus for a clutch having release fingers, said apparatus comprising a release bearing sub-assembly forming part of the clutch and a separate hydraulic cylinder sub-assembly forming part of a clutch release mechanism, said release bearing sub-assembly comprising a bearing carrier having first and second axially spaced ends, a bearing having a first race fitted to said first end of said bearing carrier and a second race, an outwardly extending flange at said second end of said carrier, said flange having a surface in engagement with the end of said fingers for releasing said clutch, means for holding the ends of said fingers in engagement with said flange surface, a housing for said bearing comprising a radially extending flange portion engaged with the second race of said bearing and a peripheral crenellated rim having axially projecting portions and cut-out portions between consecutive projecting portions, said hydraulic cylinder sub-assembly comprising a fixed annular member and a movable annular member positioned coaxially with respect to said fixed annular member and having a first end thereof sealingly engaging said fixed annular member and having a crenellated rim at its other, free end provided with alternating projecting and cut-out portions, and means operative in response to relative axial movement between said free end of said movable annular member and said bearing housing to couple said crenellated rims with said projecting portions of one of said rims fully introduced into the cut-out portions of the other of said crenellated rims.

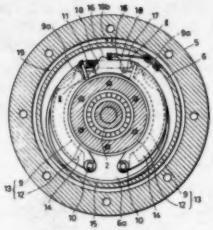
4,687,085

CENTRIFUGAL CLUTCH INSTANTLY ENGAGEABLE AND DISENGAGEABLE

Yasuo Shimizu, and Masami Ogura, both of Kamifukuoka, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 5, 1983, Ser. No. 510,939
Claims priority, application Japan, Jul. 6, 1982, 57-117379
Int. Cl.[4] F16D *23/10*
U.S. Cl. 192—89 W **10 Claims**

1. A centrifugal clutch comprising: an input member; an output member; a first engaging member connected to one of said input member and said output member; and a second engaging member connected to the other of said input member and said output member and movable relative to said first engaging member for frictional engagement therewith; a centrifugal weight formed in a discrete body separate from said first and second engaging members and displaceable in response to centrifugal force produced therein; engaging means responsive to displacement of said centrifugal weight for causing engagement and disengagement of said second engaging member with and from said engaging member; and governing means for controlling the action of said engaging means, said governing means being adapted to control the action of said engaging means such that said engaging means holds said first and second engaging members in one state of engagement and disengagement when the centrifugal force of said centrifugal weight is smaller than a predetermined value, and shifts said



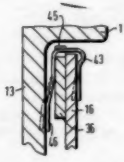
first and second engaging members into the other state of engagement and disengagement instantly after the centrifugal force of said centrifugal weight has reached said predetermined value; wherein said governing means is adapted to control the displacement of said centrifugal weight in a manner such that said governing means first counteracts the centrifugal force of said centrifugal weight, then does not substantially act upon the centrifugal force of said centrifugal weight, and thereafter promotes the centrifugal force of said centrifugal weight.

4,687,086

TORSIONAL VIBRATION DAMPERS

Christopher G. Ward, Leamington Spa, England, assignor to Automotive Products plc, Warwickshire, England

Filed May 9, 1986, Ser. No. 861,443
Claims priority, application United Kingdom, May 10, 1985, 8511914
Int. Cl.[4] F16D *3/66*
U.S. Cl. 192—106.2 **9 Claims**



1. A torsional vibration damper comprising:
a first member in the form of a hub;
a second member having a plate-like portion mounted for limited relative angular movement with respect to said first member;
resilient means acting between said first and second members to control the angular movement;
a control member having a plate-like portion positioned adjacent to the plate-like portion of said second member, said control member being mounted for angular movement with respect to said first and second members;
stop means limiting angular movement between said control member and one of said first and second members to limit angular movement between said control member and said one of said first and second members to less than the

angular movement between said first and second members; and

at least one spring clip engaging around adjacent portions of the plate-like portion of said control member and another of said first and second members to hold said plate-like portion in frictional engagement with said another of said first and second members.

4,687,087

TORSIONAL VIBRATION DAMPER

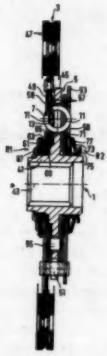
Gerhard Tebbe, Geldersheim, Fed. Rep. of Germany, assignor to Fichtel & Sachs AG, Schweinfurt, Fed. Rep. of Germany

Filed Aug. 23, 1985, Ser. No. 769,155

Claims priority, application Fed. Rep. of Germany, Aug. 30, 1984, 3431809

Int. Cl.[4] F16D *3/14*

U.S. Cl. 192—106.2 **9 Claims**



1. A torsional vibration damper, comprising

(a) two main parts (**1, 3**) rotatable in relation to one another about a common axis of rotation,

(b) at least one pair of springs (**7, 9**) arranged in series-connection with one another and coupling said two main parts (**1, 3**) rotationally elastically with one another,

(c) a first friction damper device (R_1) and a second friction damper device (R_V),

(d) an intermediate part (**5**) rotatable about the common rotation axis relative to said two main parts (**1, 3**) and said springs (**7, 9**) of the pair are supported on one another during the relative rotation of said two main parts (**1, 3**),

(e) said first friction damper device (R_1) acts directly between said two main parts (**1, 3**) and is connected in parallel with the series connection with said at least one pair of springs (**7, 9**), said second friction damper device (R_2) acts between said intermediate part (**5**) and one of said main parts and is connected in parallel with only one of said springs, and said intermediate part (**5**) is coupled with the other one of said main parts only by means of the other of said two springs of said at least one pair.

4,687,088

CUBICLE FOR MACHINING CENTERS

Werner Babel, Pfronten, Fed. Rep. of Germany, assignor to MAHO Aktiengesellschaft, Fed. Rep. of Germany

Filed Feb. 19, 1986, Ser. No. 830,968

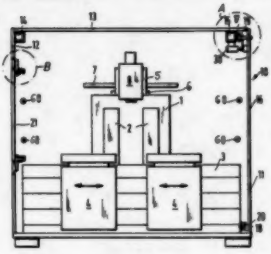
Claims priority, application Fed. Rep. of Germany, Feb. 20, 1985, 3505875

Int. Cl.[4] F16P *1/02*

U.S. Cl. 192—133 **18 Claims**

1. An enclosure for a machining center of the type wherein a workpiece is mounted on a table which moves in a direction of motion during machining, and wherein the enclosure includes front and side walls supported by a frame, such enclosure being characterized in that

at least a portion of a side wall is spring-mounted for non-destructive movement along the direction of motion when said portion is contacted by the workpiece; and



the enclosure has mounted thereon a switch responsive to the motion of the workpiece against said portion, for stopping motion of the table.

4,687,089

COIN STORAGE BOX AND AUTOMATIC TELLER

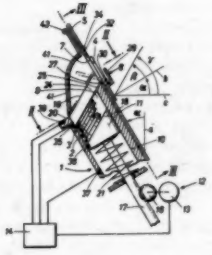
Werner Wuethrich, Gümligen, Switzerland, assignor to Autelca AG., Gumligen, Switzerland

Filed Aug. 26, 1985, Ser. No. 769,392

Claims priority, application Switzerland, Aug. 29, 1984, 4133/84; May 1, 1985, 1840/85

Int. Cl.[4] G07F *5/10, 9/06, 3/04, 1/04*

U.S. Cl. 194—230 **14 Claims**



1. A coin storage box, especially for automatic tellers, comprising a stacking box (**1, 50**) having a cavity (**9**) with a top opening for receiving superimposed stacked coins (**2, 3**) in said cavity (**9**), a stack carrier (**11**) in said cavity (**9**) for supporting the stacked coins (**2, 3**), a reversible drive mechanism (**12**) connected to said stack carrier (**11**) and operative to raise and lower said stack carrier (**11**) within said cavity (**9**), a rim portion (**20, 55**) on said stacking box adjacent the top opening, said stack carrier (**11**) having an inclined top surface (**18**) whereby a coin that has been raised in said cavity (**9**) over the rim portion by raising the stack carrier (**11**) in said cavity (**9**) slides downwards along the coin lying therebelow in the stack of coins or along said inclined top surface (**18**) and over part of said rim portion (**20, 55**), coin detector means (**35, 72**) connected adjacent the top opening responsive to the presence of a coin in the top opening of said stacking box (**1, 50**), a control device (**14**) connected to said coin detector means (**35, 72**) and to said reversible drive mechanism (**12**), and said reversible drive mechanism (**12**) operative by said control device (**14**) to lower said stack carrier (**11**) during the stacking of coins thereon as long as said coin detector means (**35, 72**) responds to the presence of a coin in the top opening.

4,687,090

COIN GUIDE HAVING TRACK SECTIONS ARRANGED IN ZIG ZAG FORM

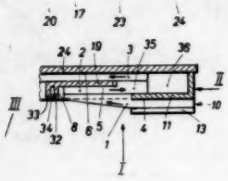
Hans Ramseier, Gumligen, Switzerland, assignor to Autelca AG., Gümligen, Switzerland

Filed Aug. 26, 1985, Ser. No. 769,501

Claims priority, application Switzerland, Aug. 29, 1984, 4134/84

Int. Cl.[4] G07F 3/02

U.S. Cl. 194—317 13 Claims



8. A coin guide, having at least a first (1, 4) and a second runway (2, 5), being arranged in different directions,

said first runway (1, 4) including a first track surface (1) and a steep guide surface (4) steeply inclined to the horizontal for supporting an inserted coin at its circumference and at one of its sides respectively,

said first track surface (1) being inclined to the horizontal both in its longitudinal and in its lateral direction and having an upper and a lower longitudinal edge,

said steep guide surface (4) extending along an upstream portion of said lower longitudinal edge of said first track surface (1) and defining a plane,

said first track surface (1) and said steep guide surface (4) being arranged at an inclination and steepness respectively, such that the coin simultaneously rolls along the first track surface and slides along the guide surface,

a transition area, at which a coin runs beyond a downstream portion of said lower longitudinal edge of said first track surface (1) and into said second runway (2, 5),

a baffle surface (8) arranged at said transition area for changing the direction of a coin running from the first into the second runway (1, 4; 2, 5),

the improvement comprising said baffle surface (8) having a front edge in alignment with said plane of said steep guide surface (4) and rearwardly of a longitudinal path of travel for the coins on said first track surface (1) defined by the upper and lower longitudinal edges on the upstream portion of said track surface (1), said baffle surface (8) extending rearwardly from said front edge and from said plane of said steep guide surface (4) in a direction away from said first runway (1, 4) and laterally of said second runway (2, 5),

and said first runway (1, 4) having in a direction parallel to said steep guide surface (4) an open downstream end in alignment with the longitudinal path of travel for the coins, whereby a long straight line foreign body slipped along said first track surface (1) parallel to and abutting on the steep guide surface (4) can pass forwardly of and beyond the front edge of said baffle surface (8) and drop off an open downstream end of the first runway (1, 4) into a free space.

4,687,091

POSITIONING AND STOP DEVICE FOR WORKPIECE CARRIERS OF A CONVEYOR

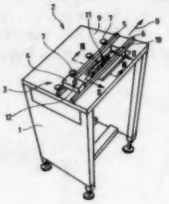
Walter Sticht, Karl-Heinrich-Waggerl-Strasse 8, A-4800 Attnang-Puchheim, Austria

Filed Jan. 28, 1985, Ser. No. 695,796

Claims priority, application Austria, Feb. 6, 1984, A 362/84

Int. Cl.[4] B65G 21/20

U.S. Cl. 198—345 11 Claims



1. In a production plant for processing workpieces at successive work processing stations:

(a) a workpiece carrier having a transverse cross-section and a surface extending perpendicularly thereto, the workpiece carrier having

(1) a stop projecting from the surface outside the cross section of the workpiece carrier,

(b) a conveyor device for conveying the workpiece carrier in a conveying direction extending substantially parallel to the workpiece carrier surface,

(c) a stop carrier element disposed adjacent the conveyor device outside the cross section of the workpiece carrier and movable substantially transversely to the conveying direction, the stop carrier element defining

(1) a plurality of mounting recesses arranged successively in the conveying direction,

(d) means for substantially transversely moving the stop carrier element, and

(e) at least one exchangeable stop element removing mounted in a respective one of the mounting recesses for cooperating with the workpiece carrier stop upon transverse movement of the stop carrier element for positioning and stopping the workpiece carrier at a respective one of the work processing stations.

4,687,092

PROPORTIONALLY DISPLACED COUPLED WALKING BEAMS

Francis M. Ray, Glenview, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Filed Dec. 13, 1985, Ser. No. 808,789

Int. Cl.[4] B65G 47/31

U.S. Cl. 198—461 13 Claims

1. A transport system for moving articles along a linear path comprising:

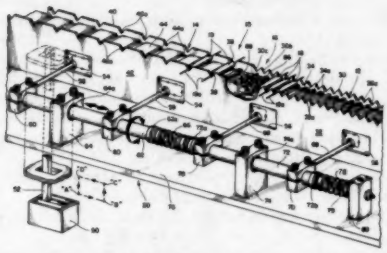
a first walking beam for supporting and transporting articles positioned thereon, said first walking beam having a first end and characterized as having a first pitch;

a second walking beam for supporting and transporting articles positioned thereon, said second walking beam having a second end positioned adjacent to the first end of said first walking beam and characterized as having a second pitch wherein said first and second pitches are different;

drive means coupled to said second walking beam for displacing said second walking beam in a first reciprocating, repetitive manner characterized by an alternating sequence of first and second vertical and horizontal displacements wherein said first and second vertical displace-

ments and said first and second horizontal displacements are in opposite directions; and

proportional coupling means for coupling said first and second walking beams and for displacing said first walking beam in a second reciprocating, repetitive manner corresponding to said first reciprocating, repetitive manner and characterized by an alternating sequence of third and



fourth vertical and horizontal displacements, wherein said third and fourth vertical displacements and said third and fourth horizontal displacements are in opposite directions and said third and fourth horizontal displacements are not equal to said first and second horizontal displacements and wherein the articles are transferred from the first end of said first walking beam to the second end of said second walking beam.

4,687,093

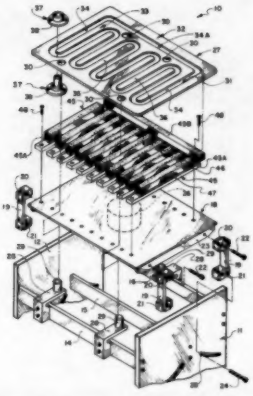
VIBRATORY FEEDER

James W. Marshall, Denton; Michael J. Haaser, Perry Hall, and Alex A. Vanicky, Timonium, Gary S. Podhorniak, Baltimore, all of Md., assignors to Advanced manufacturing Systems, Inc., Sparks, Md.

Filed Nov. 9, 1984, Ser. No. 670,030

Int. Cl.[4] B65G *37/00*

U.S. Cl. 198—465.2 **31 Claims**



30. A vibratory feeder for articles of manufacture, comprising a frame, a platen, means for resiliently mounting the platen on the frame, a tray removably mounted on the frame above the platen and spaced therefrom, means for aligning the tray on the frame, the tray having a continuous through opening formed therein and defining a substantially serpentine path through the tray, the path including a plurality of respective inner and outer portions substantially parallel to one another, the path further including a pathway arranged substantially at right angles to the parallel portions of the path and communicating with the parallel portions at respective ends of the tray, whereby the length of the path is substantially maximized while the size of the tray is substantially minimized, and whereby the tray is separated into an outer portion and an inner portion meshing with respect to each other, a plurality of carriers mounted in the path for supporting articles of manufacture, the carriers being in substantial abutting relationship to one another substantially throughout the length of the path in the tray, means for restraining the carriers against substantial vertical movement but accommodating a limited free-floating lateral movement in the plane of the tray, said last-named means including flange means on the carriers and cooperating with the respective inner and outer portions of the tray to prevent said respective inner and outer tray portions from separating from one another, and vibratory means associated with the platen for advancing the carriers along the path in the tray.

4,687,094

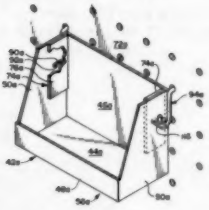
CONTAINER DISPLAY METHOD AND APPARATUS

Ivor J. Allsop; Michael G. Allsop; James D. Allsop, and Eivind Clausen, all of Bellingham, Wash., assignors to Allsop, Inc., Bellingham, Wash.

Filed Jan. 7, 1986, Ser. No. 816,820

Int. Cl.[4] B65D *5/52*

U.S. Cl. 206—44 R **28 Claims**



18. A mounting assembly for mounting product for display and/or convenient access, said assembly comprising:

a. a base container defining a containing area to support said product in a manner to expose said product in said containing area, said base container comprising at least two side walls, each having an inwardly facing surface and an outer surface, a bottom wall and a back portion, and the base container being constructed so that with said product in the containing area, the base container with said product therein can be supported from said side walls;

b. a pair of mounting members, each of which is mounted at a related one of said side walls at a mounting position, each mounting member having a mounting element which is positioned outwardly of the outer surface of its related said side wall and which is in supporting engagement with its related side wall in a manner to leave said containing area substantially unobstructed;

c. vertically aligned board support means having a vertically aligned contact surface and a plurality of spaced mounting locations thereon some of which are vertically spaced from one another;

d. a pair of connecting members, each of which has a first connecting end engaging a related one of said mounting elements and a second mounting end engaging said board support means at a selected one of said mounting locations, in a manner to support the base container with the product therein from the board support means, said connecting members being characterized in that each connecting member exerts an upward and rearward force from its related mounting member to said board support means with the back portion of the container bearing against the vertically aligned contact surface of the board support means.

4,687,095

BOX PROVIDED WITH A LINT REMOVER AND DUST BRUSH

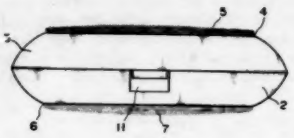
Shoichi Iwasaki, Maibaramachi, Japan, assignor to Iwasaki Sangyo Kabushiki Kaisha, Japan

Filed Jan. 31, 1986, Ser. No. 824,742

Claims priority, application Japan, Aug. 2, 1985, 60-118113[U]

Int. Cl.[4] B65D *81/00, 85/00*

U.S. Cl. 206—234 15 Claims



1. A box provided with a lint remover and a dust brush including a plurality of hairs set in an external surface of a lid of the box, and a plurality of loops of rigid yarns provided on a cloth material attached to an external surface of a side of a main body of said box.

4,687,096

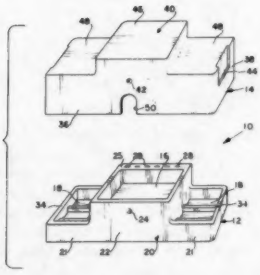
CONTAINER FOR GOLF ACCESSORIES

Paul G. Mansur, 3232 Hilary Cir., Palm Harbor, Fla. 33563

Filed Jul. 21, 1986, Ser. No. 887,351

Int. Cl.[4] B65D *85/00*

U.S. Cl. 206—315.9 5 Claims



1. A container for golf balls, tees, and other accessory items, said container of the type having utility in connection with the storage of golf accessory items in the trunk, glove compartment or other storge facility provided in an automobile or other road vehicle between games of golf and storage of personal items during actual play, said tray being taken from a trunk or other storage facility at the commencement of play and returned thereto after play, and being kept on a golf cart during play, comprising:

a base means;

a plurality of compartments formed in said base means;

each of said compartments specifically configured and dimensioned to retain therein a golf ball;

a tray means formed in said base means;

said tray means specifically configured and dimensioned to retain therein car keys and other sundry items;

a plurality of tee-retaining means formed in said base means;

each of said tee-retaining means specifically configured and dimensioned to releasably mount a tee therein;

a closure means for capping said base means;

said closure means having a planform substantially conforming to the planform of said base means and having a dimension slightly larger than said base means so that said base means is capped when said closure means is positioned in overlying relation thereto;

interlocking means for releasably engaging said base means and said closure means;

registration means formed in said base means and in said closure means to provide a means whereby said closure means may be properly and operatively positioned with respect to said base means when the base means is capped by said closure means;

said base means and said closure means formed of flexible material;

said interlocking means including a hemispherical in configuration recess portion formed in said closure means and a complementally formed protrusion portion formed on said base means, said recess and protrusion portions entering into snap fit alignment with one another when said base means is capped by said closure means;

said base means including at least one side wall upon which is formed said protrusion portion;

said closure means including at least one side wall within which said recess portion is formed;

a finger or thumb-receiving cut away portion formed in said closure means side wall so that a side wall of said base means may be momentarily depressed to disengage the interlocking snap fit between said closure means and said base means;

said registration means including an inwardly projecting ridge means formed in a side wall of said closure means, said ridge means abuttingly engaging an uppermost edge of a side wall of said base means when said closure means is positioned in overlying relation to said base means, said abutting engagement preventing said closure means from entering into a closer fit with said base means.

4,687,097

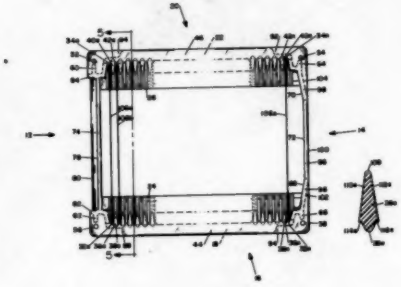
WAFER PROCESSING CASSETTE

Roger L. Mortensen, Chanhassen, Minn., assignor to Empak, Inc., Chanhassen, Minn.

Filed Dec. 11, 1984, Ser. No. 680,516

Int. Cl.[4] B65D *85/30*

U.S. Cl. 206—334 2 Claims



1. Wafer cassette comprising:

a. plurality of opposing wafer dividers, each of said dividers including an interiorly facing rounded tooth edge, vertical surfaces at opposite sides of said interiorly facing rounded tooth edge, a rounded exteriorly facing tooth edge with exteriorly facing substantially flat surfaces between said vertical surface and said exteriorly facing rounded tooth edge and including a portion rounded along a perimeter of a wafer for encompassing and conforming to circumference of the wafer;

b. upper and lower opposing longitudinal horizontal supports supporting said wafer dividers, said lower horizontal

supports having a length less than that of said upper horizontal supports;

c. plurality of opposing upper and lower edge members and opposing rounded vertical side members for supporting said wafer dividers;

d. rear-end member including a substantially downward arch providing an open top portion and secured to said side members; and,

e. open H-bar end front member, said H-bar end including opposing vertical reinforcing edge members, a horizontal H-bar member running therebetween, said horizontal H-bar member including a reinforcing partial section cylindrical rod, and an upper ramped portion and a lower rectangular portion about said H-bar whereby said open area of said H-bar end, said rear end, and upper and lower horizontal supports attach to each said wafer dividers provides for structural integrity and nonrestricted open surface automated processing of wafers, thereby providing a structurally integral wafer cassette for integrated circuit automated processing of said wafers in a wafer cassette.

4,687,098

STAPLE CASSETTE

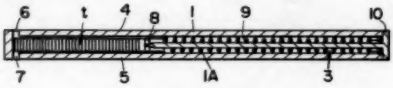
Yoshiyuki Ebihara, Tokyo, Japan, assignor to Etona Company, Limited, Tokyo, Japan

Filed Aug. 25, 1986, Ser. No. 899,679

Claims priority, application Japan, Mar. 18, 1986, 61-58028

Int. Cl.[4] B65D *85/24*

U.S. Cl. 206—340 **2 Claims**



1. A staple cassette comprising a relatively elongated body having a hollow portion extending throughout the length of said body and having a pair of staple driving apertures formed in said body adjacent to its forward end and aligned with each other, a pair of openings formed in the sidewalls of the body adjacent its rearward opened end, and feeder means in said hollow portion for resiliently urging a set of staples in said hollow portion toward the forward end thereof, said feeder means including a feeder element engaging the rearward end of said staple set housed in said hollow body portion, a coil spring mounted in said hollow body portion to engage the rearward end of said feeder element and a cap mounted on said cassette body to close its rearward opened end and engaging the opposite end of said coil spring, said cap including a pair of projections adapted to snap-fit into the respective pair of openings on the sidewalls of said cassette body when said cap is pressed into the rearward opened end of said cassette body.

4,687,099

PACKAGE FOR COSMETIC PRODUCTS

Cornelis Van Buuren, Vlielandseweg 73, 2641 Ka Pijnacker, Netherlands

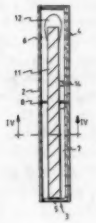
Filed Dec. 27, 1985, Ser. No. 814,354

Claims priority, application Netherlands, Dec. 28, 1984, 8403959

Int. Cl.[4] B65D *85/20*

U.S. Cl. 206—362 **9 Claims**

1. A package comprising a plurality of elongate sticks, a wrapper having means defining an opening extending thereinto, and a tray which can be slidably moved into and out of said opening in said wrapper; wherein said tray includes a bottom wall having upstanding walls adjacent peripheral edges thereof, two of said upstanding walls being adjacent opposite peripheral edges of said bottom wall and each being divided by an interruption in a middle portion thereof into first and second portions, and wherein said tray includes first and second parts which each include a respective portion of said bottom wall, said tray further including means for facilitating pivotal movement of said first part with respect to said second part thereof; wherein said first part of said tray has support means located between said upstanding walls for removably supporting said sticks on said tray, each said stick having at one end thereof a



head made of a cosmetic product, said support means having therein a plurality of elongate parallel recesses which can each removably receive an end of a respective said stick remote from said head thereof and which are spaced sufficiently from each other so that said heads of said sticks are free of engagement with each other, each said recess having a length approximately equal to half of a length of each said stick and each said stick having a width which is approximately the same as a width of the corresponding recess.

4,687,100

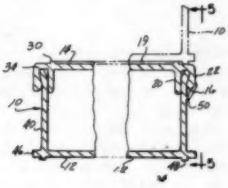
REEL STORAGE CONTAINER

Elsmer W. Kreeger, Howell, Mich., assignor to Pinckney Molded Plastics, Inc., Howell, Mich.

Continuation of Ser. No. 677,919, Dec. 4, 1984, abandoned, which is a continuation-in-part of Ser. No. 627,678, Jul. 5, 1984, abandoned. This application Dec. 4, 1985, Ser. No. 804,284

Int. Cl.[4] B65D *85/66, 85/671*

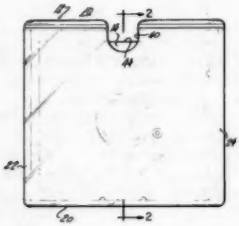
U.S. Cl. 206—403 **14 Claims**



1. In a container for storing tape reels in a sealed environment, a pair of open-mouthed, relatively stiff, engageable, circular, hollow members, one of said members at its mouth having a peripheral edge and the other of said members at its mouth having a peripheral edge receiving groove to removably and frictionally engage said edge; the improvement comprising:

a hinge member having an upper and lower surface thereon integrally connecting a selected length of the outer peripheral portions of each of said members such that said other member is rotatable with respect to said first member from a first disengaged position to a second position wherein said other member groove engages said edge, said hinge member having a ball cut on its lower surface along its entire length at a portion immediately adjacent the peripheral portion of said one member defining a first hinge line for permitting said hinge member to rotate about said first hinge line toward and away from said one member, thereby providing a hinge point characterized by an absence of sharp edges and the ability to resist breakage over extended periods of use, said hinge member having an inclined surface portion on its upper surface tapering the upper surface toward the lower surface along its length at a portion immediately adjacent the peripheral portion of said other member defining a hinge surface for permitting said other member to rotate about a section of said hinge surface toward and away from said mouth of said one member to facilitate bending and to reduce wear on the hinge member over extended periods of use, said hinge surface contacting a curved edge of said groove on said other member while in said second position.

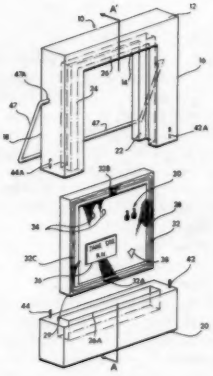
4,687,101
DISK PROTECTOR/HOLDER
John L. Barker, Sr., and John L. Barker, Jr., both of 2043 Lancer, Troy, Mich. 48084
Filed Oct. 21, 1985, Ser. No. 789,650
Int. Cl.[4] B65D *85/30, 85/57*
U.S. Cl. 206—444 **3 Claims**



1. A disk protector/holder comprising:
a housing formed of rigid material having spaced top and bottom major wall surfaces, opposed side walls, a closed bottom edge and an open top end;
a first outer edge of the bottom wall surface adjacent the open top end extending outward a short distance beyond a second outer edge of the spaced top wall surface adjacent the open top end, the first and second outer edges of the top and bottom wall surfaces adjacent the open top end having inwardly tapering surfaces;
a pair of aligned slots formed in the top and bottom wall surfaces adjacent to the first and second outer edges of the top and bottom wall surfaces and extending downward toward the bottom edge and
upwardly extending surfaces formed adjacent the bottom edge defining a sharply-angled V-shaped notch between the bottom edge and the top and bottom wall surfaces to securely receive the bottom edge of a planar disk.

4,687,102
Patent Not Issued For This Number

4,687,103
JEWELRY DISPLAY DEVICE
Mary D. Corbett, 2009 Hamilton La., Carmel, Ind. 46032
Filed Jul. 23, 1985, Ser. No. 758,166
Int. Cl.[4] B65D *73/00*
U.S. Cl. 206—566 **3 Claims**



1. A device for displaying jewelry and the like having a decorative front face and a back portion having at least one pin-like shaft which attaches to a clamping means, the device comprising:
an outer frame having a central opening and a narrow channel extending inwardly from and surrounding a substantial portion of the periphery of said opening;
an inner frame shaped and sized to be received in said channel;
a panel of woven material adapted to be penetrated by the pin-like shaft and having means attaching said panel to said inner frame;
said outer frame including means for holding said inner frame in the channel of said outer frame; and
means for holding the device in a substantially upright position.

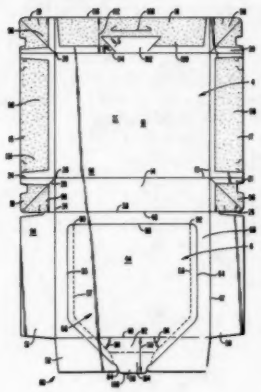
4,687,104
MICROWAVE CARTON

Angelo Ielmini, Patterson, Calif., assignor to Patterson Frozen Foods, Inc., Patterson, Calif.

Continuation-in-part of Ser. No. 742,246, Jun. 7, 1985, abandoned. This application Dec. 31, 1985, Ser. No. 815,321

Int. Cl.[4] B65D 5/54

U.S. Cl. 206—607 20 Claims



1. A microwave carton comprising:

a one piece body including:

a base portion including a bottom having corners and a bottom periphery, sides extending from the periphery and web corners between the sides at the corners, the base portion being creased along the base periphery, at the intersection of the web corners and at the sides and centrally along the web corners and at the sides and centrally along the web corners so to aid folding the sides normally to the bottom, the bottom, the sides and the web corners providing a seamless, liquid containing carton bottom;

a top, having first, second, third and fourth edges, the top integrally connected to and extending from an outer edge of one of the sides at the first edge, the top sized to overlie the bottom;

a front flap extending from the third edge, the third edge being opposite the first edge;

side flaps extending from the second and fourth edges;

the top and the front flap together including a top flap, the top flap having a lifting tab at an outer edge of the front flap;

first and second tearable joints extending from the lifting tab to the third edge, from the third edge along paths generally parallel to and spaced apart from the second and fourth edges respectively, and to transition area positions spaced apart from the first edge so to define said top flap and a U-shaped strengthening region of said top, the top flap overlying a substantial portion of the bottom; and

crease segments between the front flap and the top, the crease segments spaced apart from the score lines.

4,687,105
ARRANGEMENT IN GRADING AND CLEANING MACHINES WITH SCREENS

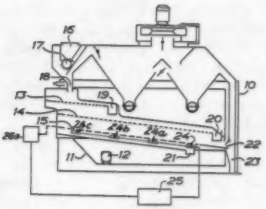
Thomas Edholm, Staffanstorp, and Ulf Stahl, Höllviksnäs, both of Sweden, assignors to Kamas Industri AB, Vellinge, Sweden

Continuation of Ser. No. 685,598, Dec. 26, 1984, abandoned, which is a continuation of Ser. No. 470,534, Feb. 28, 1983, abandoned. This application Oct. 9, 1985, Ser. No. 786,228

Claims priority, application Sweden, Mar. 3, 1982, 8201295

Int. Cl.[4] B07B 1/42

U.S. Cl. 209—546 6 Claims



1. In a grading and cleaning machine with a screen and an input means for providing an adjustable input flow of material to the screen, the arrangement comprising a plurality of sensors arranged below the screen and distributed therealong to measure the flow of material passing through the screen at points along its surface, and a response circuit for generating electric signals in response to particles impinging on the sensors, said response circuit including means for sensing the number of particles impinging on each sensor and for adjusting the throughput of the machine by automatically comparing the impingement on each sensor to a predetermined mathematical model having predetermined maximum and minimum parameters and regulating said input means, to maintain the throughput within said parameters at all points along the screen where sensors are located.

4,687,106
LETTER-MAIL CHECKING DEVICE

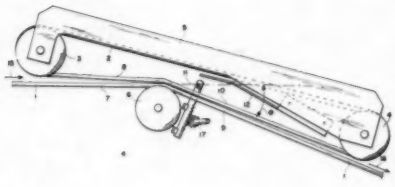
Geert J. Prins, Delft, Netherlands, assignor to Staat der Nederlanden (Staatsbedrijf der Posterijen, Telegrafie en Telefonie), The Hague, Netherlands

Continuation of Ser. No. 619,055, Jun. 11, 1984, abandoned. This application Apr. 27, 1986, Ser. No. 869,442

Claims priority, application Netherlands, Jun. 13, 1983, 8302102

Int. Cl.[4] B07C 1/16

U.S. Cl. 209—552 4 Claims



1. A checking device for detecting letters which expand a processing acceptability criterion from acceptable letters which do not exceed said criterion, said criterion taking account of thickness, rigidity, length, and weight; said device comprising:

a moving belt conveyor for conveying said letters, said conveyor having a first part moving in a first direction and a second part moving in a second direction;

means, including a guiding roller (6) having, at all times

during motion of said conveyor, a circumferential portion in contact with said conveyor, for deflecting movement of said conveyor from said first direction to said second direction;

a bed of side-by-side endless elastic belts (2) mounted on and around, and extending between, first and second pulleys (3,4) respectively mounted on rotation on spaced-apart fixed shafts and located relative to the conveyor and guiding roller in such a manner that a short portion of said bed of belts opposite said guiding roller, which short bed portion has a longitudinal dimension corresponding to said circumferential portion of said guiding roller then in contact with said conveyor, is flexibly held in engagement with said conveyor on the side of the conveyor opposite the side which is in engagement with said guiding roller, for imparting movement to said bed of belts in the same direction as the movement of said conveyor, while a first adjacent portion of said bed of belts (2) extending immediately before the location of said guiding roller remains spaced and clear from said conveyor (1) and a second adjacent portion of said bed of belts (2) extends beyond the location of said guiding roller and becomes disengaged from said conveyor, said letters being conveyed between the conveyor and the bed of belts; and

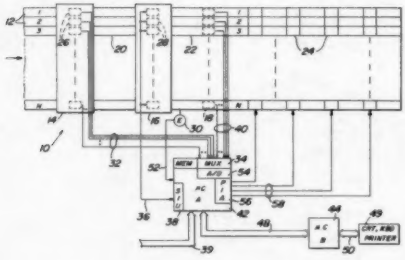
means for detecting the displacement of at least one belt of said belts beds of belts (2) from a normal attitude which said bed of belts has while acceptable letters are between it and said conveyor, to an attitude of displacement of said at least one belt caused by a letter which exceeds said processing acceptability criterion; said detecting means including means (11) for providing a pencil-beam shaped detection region extending parallel to and transverse to said second adjacent portion (10) of said bed of belts, said detection region being spaced at a predetermined distance from the location where said conveyor has its movement deflected by said deflecting means from said first direction into said second direction.

4,687,107

APPARATUS FOR SIZING AND SORTING ARTICLES

Ian A. Brown; Dennis R. McMahon; Robin R. Rosas, all of Three Rivers; Stephen D. Scopatz, Simi Valley, and Karen L. Wind, Three Rivers, all of Calif., assignors to Pennwalt Corporation, Philadelphia, Pa.

Filed May 2, 1985, Ser. No. 729,585
Int. Cl.[4] B07C *5/00;* **G01B** *11/10;* **G06F** *15/62;* **H04N** *5/335*
U.S. Cl. 209—556 **17 Claims**



1. Apparatus for sorting an article according to plural criteria comprising:

(a) conveyance means for transporting the article through a plurality of inspection stations, the conveyance means including means for raising individual articles to a location having an elevation above all other articles being transported;

(b) first inspection station means adjacent said location for obtaining an image of the entire upper surface of the article at one time and providing data signals indicative of the article's volume;

(c) second inspection station means for providing data signals indicative of the article's color;

(d) third inspection station means for providing data signals indicative of the article's weight;

(e) processing means receiving the data signals from the first, second and third inspection stations for categorizing the article into one of a plurality of grades based upon a desired combination of the article's volume, color and weight; and

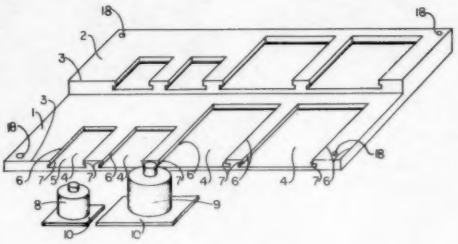
(f) discharge means coupled to the processing means for discharging the article from the conveyance means at a selected location based upon the grade into which the article has been categorized.

4,687,108

FLANGED ITEM HOLDER

James W. Kernodle, Sr., Rte. 2, Box 542, Durham, N.C. 27705

Filed Jul. 31, 1986, Ser. No. 891,130
Int. Cl.[4] A47F *7/00*
U.S. Cl. 211—13 **6 Claims**



1. A device for holding bottles and office supplies, comprising in combination:

(A) a base having

(1) a curved top surface having an edge,

(2) means for securement of said base to a flat surface,

(3) a plurality of channels in said top surface, each channel

(a) being rectangular in shape,

(b) having an insertion edge being congruous with an edge of said top surface, and

(c) having two side edges perpendicular and abutting said insertion edge, each side edge having flanges flush with the top surface which project inward towards said channel; and

(B) at least one receptacle having a flat bottom with outwardly projecting rectangular flanges capable of sliding into the channel of said base, said outwardly projecting rectangular flanges of the receptacle having indentations on the flange corners, and the flange of each side edge having two knobs projecting downward into said channel, so that the knobs fit into the indentations of the receptacle flanges when the receptacle is slid into said channel.

4,687,109

RADIO CONTROLLED ELECTRIC SLACK PULLER, BRAKE AND BATTERY RECHARGING SYSTEM

Glenn T. Davis, 17454 Alsea Hwy., Alsea, Oreg. 97324

Filed Jul. 3, 1986, Ser. No. 881,817
Int. Cl.[4] B66C *21/00*
U.S. Cl. 212—76 **10 Claims**

1. An electric radio controlled log yarding carriage comprising:

a skyline and a drop or skidline,

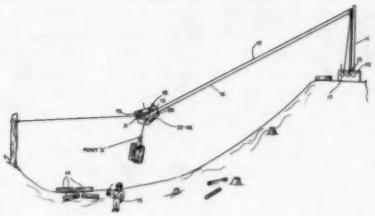
a yarder means operatively connected with said skyline and skidline,

a carriage having radio control means and storage battery

means electrically connected with the radio control means,

storage battery charging means on the carriage including at least a sheave rollingly engaging said skyline and operating the charging means while traveling in either direction along the skyline,

electrically controlled skyline and skidline brakes on the carriage and being electrically connected with said storage battery means and radio control means,



a skidline slack pulling sheave on the carriage engaged with the skidline,

an electrical slack pulling motor on the carriage electrically connected with the storage battery means and radio control means, and

a torque multiplier means connected between the electrical slack pulling motor and said skidline slack pulling sheave.

4,687,110

APPARATUS FOR ANGULARLY DISPLACING A LOAD

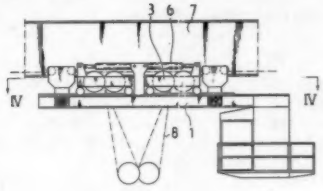
Paavo Partanen, Hyvinkää , and Soini Söderena, Korpi, both of Finland, assignors to Elevator GmbH, Baar, Switzerland

Continuation of Ser. No. 721,453, Apr. 9, 1985, abandoned. This application Sep. 2, 1986, Ser. No. 903,880

Claims priority, application Finland, Apr. 9, 1984, 841398

Int. Cl.[4] B66C *17/00*

U.S. Cl. 212—147 **6 Claims**



1. Apparatus for angularly displacing and/or moving a load suspended by ropes, including a lifting carriage frame running along a girder and carried on running wheels, lifting ropes carried by the carriage frame, and sets of rope sheaves for the lifting ropes, said apparatus comprising:

a running surface on said frame for each rope sheave set, and

means for selectively moving the rope sheave sets separately.

4,687,111

TAMPER EVIDENT CONTAINER

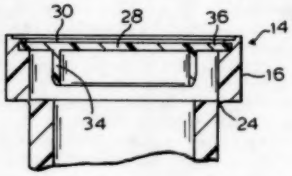
Paul Marcus, 85 Pascack Rd., Pearl River, N.Y. 10965

Filed Feb. 25, 1986, Ser. No. 833,359

Int. Cl.[4] B65D *41/58*

U.S. Cl. 215—32 **4 Claims**

1. A plastic container produced as an integral unit comprising a container body, and a cap integrally connected to the container body having a container neck and an opening in a top portion thereof, said container being adapted to be filled with product through the opening in said cap; a separately produced lid means being affixed to the cap to cover and seal the opening in the cap, said lid means cooperating with the cap to form a closure means; the closure means further comprising a stopper means, said stopper means being adapted to close an opening in the container neck after removal of the cap from the container, the position wherein the stopper means closes the opening in the container neck defining a closed position; the cap portion being affixed to the container body along a circumferential weakened line, the cap having an inner cap wall, the portion of the cap affixed to the container body being a radially inward



portion of the cap wall; the lid means of the closure means comprising a top portion extending across the entire opening defined by the cap, the stopper means having an annular member affixed to the bottom side of the top portion and extending substantially perpendicularly therefrom, the annular member having an outer surface having an outside diameter substantially equivalent to an inside diameter of the container neck, said closure means adapted to seal the opening which is created in the container neck after removal of the cap by a friction fitting.

4,687,112

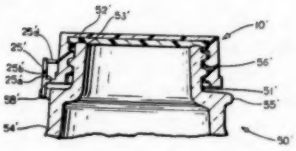
CHILD-RESISTANT PACKAGE

Peter T. Swartzbaugh, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 764,356, Aug. 12, 1985, Pat. No. 4,613,051. This application Sep. 15, 1986, Ser. No. 906,884

Int. Cl.[4] B65D *55/02*

U.S. Cl. 215—216 **7 Claims**



1. A child-resistant package comprising, in combination:

a container having a central axis and comprising an open mouth and a finish surrounding said open mouth, said finish of said container comprising:

helical thread means projecting radially outwardly from said finish; and

a flange projecting radially outwardly from said finish, the radial extent of said flange being greater than the radial extent of said helical thread means, said flange being axially spaced further along said central axis from said open mouth of said finish than said helical thread means and having at least a peripheral portion which is interrupted to define a notch in said flange between the interrupted portions thereof,

a closure surrounding and removably engaging said finish and closing said open mouth of said container, said closure comprising:

a top panel spanning the open mouth of the container;

a skirt affixed to said top panel and extending therefrom generally parallel to said central axis of said container to surround said first annular bead of said finish;

helical thread means affixed to said skirt and extending radially inwardly therefrom, said helical thread means of said closure being engageable with said helical thread means of said container to permit said closure to be screwed onto and unscrewed from said finish of said container; and

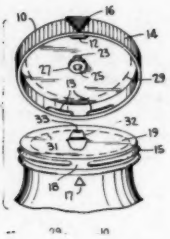
a resilient projection affixed to said skirt and extending radially outwardly and downwardly therefrom, the circumferential extent of said resilient projection being less than the circumferential extent of said notch in said flange, said resilient projection extending axially downwardly to a position which is spaced further along said central axis from said open mouth of said finish than said flange, said resilient projection clearing said finish when circumferentially aligned with said notch in said flange and being normally disposed radially inwardly of the outside of said flange to inhibit the turning of said closure on said finish in any direction when said resilient projection is circumferentially aligned with said notch in said flange, said resilient projection being elastically deformable to a position which does not inhibit the turning in any direction of said closure on said finish.

4,687,113

TAMPER EVIDENT CLOSURE

Randy F. Reeve, Upland, Calif., assignor to Calmar, Inc., Watchung, N.J.

Filed Jul. 29, 1986, Ser. No. 890,278
Int. Cl.[4] B65D *41/46*
U.S. Cl. 215—230 **4 Claims**



1. A closure for a container having an opening bounded by an outer surface, said closure comprising a cover removably mounted on said container and having an end wall overlying said opening, at least a portion of said end wall being of translucent material, a rupturable opaque liner secured to said outer surface over said opening, a support stud on said cover extending through said liner into said opening, a disc-like tamper indicating member supported on said stud beneath but unattached to said liner so as to be normally hidden from view, and said disc-like member and said liner being formed to differ visually whereby an attempt to remove said cover from said container causes said liner to rupture in the vicinity of said stud to thereby expose said disc-like member through said cover to visually indicate the removal attempt.

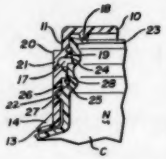
4,687,114

TAMPER INDICATING CLOSURE FOR CONTAINERS

Robert E. Crisci, New Castle, Pa., assignor to Northern Engineering and Plastics Corp., New Castle, Pa.

Filed Jan. 21, 1986, Ser. No. 820,006
The portion of the term of this patent subsequent to May 26, 2004, has been disclaimed.
Int. Cl.[4] B65D *53/00*
U.S. Cl. 215—256 **4 Claims**

1. A resilient molded plastic snap on tamper indicating closure and a container, said container including a neck surrounding an opening to the container, the neck defining an inner surface which extends longitudinally of the container, an inturned annular flange which extends radially into the opening and has an outer surface oriented transversely of the neck opening, the flange extending radially into the neck opening beyond the neck inner surface to define an outlet opening which can be off-center with respect to the container neck, and dual closure retaining means on said neck; said dual closure retaining means including a groove defined in said neck adjacent to said inturned annular flange; said closure comprising means for covering said opening to said container and a depending annular flange surrounding said neck, dual fastening means on said depending annular flange for engaging said retaining means and an annular frangible wall formed in said depending annular flange between said dual fastening means,



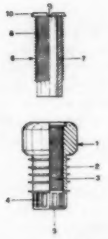
said dual fastening means including a fastening flange located to engage said neck groove; a score line formed in said depending annular flange extending to said annular frangible wall and located adjacent to said fastening flange to define a tear-skirt portion which includes all of said depending annular flange below said fastening flange, said tear-skirt portion having a pull tab affixed thereto, said means for covering said opening to said container comprising a resilient disc having said depending annular flange joined thereto at the peripheral edge of said disc, at least one flexible annular sealing bead integrally formed on said resilient disc in depending relation thereto and postioned for sealing engagement with said inturned annular flange outer surface at a location which is radially inward of the innermost surface of said neck whereby an off-center opening is sealingly covered by said closure.

4,687,115

REMOVING SEDIMENT FROM WINE

Lino Bongiovanni, Via Vittori, 37030 Ronca (Verona), Italy

Filed Jul. 23, 1985, Ser. No. 758,057
Claims priority, application Italy, Aug. 9, 1984, 84121 A/84
Int. Cl.[4] B65D *39/00*
U.S. Cl. 215—355 **10 Claims**



1. A plastic stopper for collecting dregs from a bottle of wine when the bottle is inverted, and for trapping the dregs therein before the bottle is turned upright, comprising

a first element which can be securely fitted to the bottle neck, said first element defining an internal chamber for receiving dregs from the wine, and having an aperture therein for providing communication between the cham-

ber and the bottle interior so as to admit dregs to said chamber, and

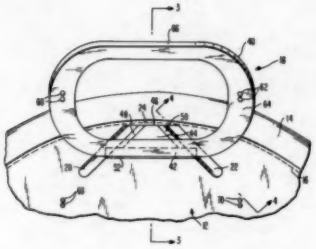
a second element movably received within said first element and having an external manipulable portion by which the second element may be moved, while the stopper is installed on the bottle, between a first position in which the aperture is open, and a second position in which the aperture is blocked by a portion of said second element, whereby one may trap dregs collected in the chamber by moving the second element to said second position while the bottle is inverted.

4,687,116

EASY OPEN CONTAINER END CLOSURE

Herbert V. Dutt, and Paul A. Santostasi, both of Sarasota, Fla., assignors to Sun Coast Plastics, Inc., Sarasota, Fla.

Filed Sep. 10, 1986, Ser. No. 905,416
Int. Cl.[4] B65D *17/34*
U.S. Cl. 220—270 **18 Claims**



18. An easy open container end closure assembly comprising:

means to attach said end closure assembly to a container;

a container end lid portion of said end closure assembly, said end lid including a separable portion partially defined by an initial break line having a first thickness;

force applying means carried by said separable portion of said lid generally adjacent said initial break line; and

first and second spaced force directing score lines formed on said lid adjacent said force applying means and having converging first ends terminating at said initial break line whereby a container end opening force applied to said force applying means causes said lid to pucker intermediate said force directing score lines thereby directing the opening force to said initial break line.

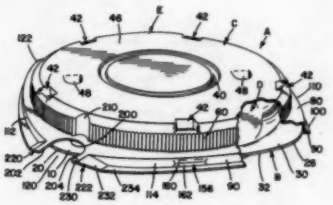
4,687,117

FROZEN FOOD PACKAGE AND COVER LID

Oskar R. Terauds, Willoughby, Ohio, assignor to The Stouffer Corporation, Solon, Ohio

Filed Aug. 18, 1986, Ser. No. 897,387
Int. Cl.[4] B65D *41/16, 41/18*
U.S. Cl. 220—306 **35 Claims**

1. In a container comprised of a molded rigid plastic bottom tray with a surrounding, laterally outward extending flanged rim and an upper dome lid comprised of a semi-rigid sheet-like member of plastic material having a laterally outwardly extending, peripherally extending seating flange matching the contour of, and seated against, the upper surface of and locked onto the said rim of the tray, to join the tray and dome lid together into a unitary assembly, said tray rim and seating flange having four sides joined at corners, the said seating flange having a depending locking flange closely fitting around the flanged rim of the tray, and the said locking flange being provided with a plurality of inwardly projecting, spaced locking ribs engageable with the tray rim under the peripheral outer edge thereof to lock the dome lid in place on the tray, the improvement comprising: said seating flange having an outwardly opening thumb notch recess intersecting the outer peripheral edge thereof, having two opposed edges, and exposing a portion of said tray rim through said recess between said opposed edges, a lid lifting tab extending radially outwardly from said locking flange at each of said opposed edges, each of said tabs being at one side of said lid, and one of said locking



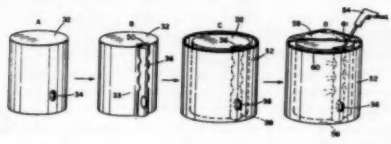
ribs being substantially spaced from each of said tabs in directions opposite to said recess to coact with said tabs during removal of said lid from said tray, said coacting rib being on the same one side of said lid as the tab with which it coacts whereby lifting of one of said tabs cams its coacting rib from around the rim of said tray by flexing of said lid between said tab and its coacting rib.

4,687,118

FOAM INSULATED TANK

Keith R. Clark, Montgomery, Ala., assignor to Rheem Manufacturing Company, Montgomery, Ala.

Division of Ser. No. 705,226, Feb. 25, 1985, Pat. No. 4,632,792.
This application Sep. 24, 1986, Ser. No. 910,973
Int. Cl.[4] B65D *25/00*
U.S. Cl. 220—444 **5 Claims**



1. An improved water tank assembly comprising, in combination:

(a) an inner tank for containing water defining a vertical axis;

(b) an outer shell surrounding the inner tank and spaced from the inner tank, said outer shell including at least one opening for access to the inner tank;

(c) a bottom pan between the inner tank and outer wall;

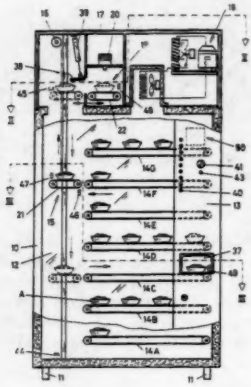
(d) a flexible bag having a void therethrough defining a passage aligned with the outer shell opening, said bag including at least one side relief opening into the space between the inner tank and outer shell and also including a top opening, said bag being generally elongated and aligned with the vertical axis; and

(e) said bag being filled with expandable foam material through the top opening to fill the bag and then the space between the inner tank and outer shell by flow through the relief opening.

4,687,119
DISPENSER FOR HOT AND COLD PRODUCTS

Hubert Juillet, 8, Place des Philosophes, 1205 Geneve, Switzerland

Filed Oct. 23, 1985, Ser. No. 793,319
Int. Cl.[4] A47F *1/04*
U.S. Cl. 221—101 **4 Claims**



1. An automatic dispenser for hot and cold food products comprising:

(a) a cabinet provided with means for cooling said cabinet,

(b) a plurality of horizontal conveyor belts disposed one above another in said cabinet, each of said conveyor belts comprising end rollers, a motor for driving one of said rollers and a belt trained on said rollers, said conveyor belts having ends aligned in a vertical plane spaced from a side of said cabinet, said conveyor belts comprising a plurality of storage belts for storing products to be dispensed and one delivery belt,

(c) said cabinet having a delivery door at an end of said delivery belt opposite said aligned ends,

(d) an oven in said cabinet disposed above said horizontal conveyor belts, said oven having a door, controllable means for opening and closing said door and a conveyor in said oven, said conveyor comprising two end rollers, a reversible motor for driving one of said rollers and a conveyor belt trained on said rollers, an end of said belt adjacent said door being vertically aligned with said aligned ends of said horizontal conveyor belts,

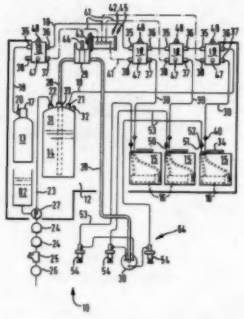
a lift in said cabinet disposed adjacent said aligned ends of said horizontal conveyor belts, said lift comprising vertical guide means, a frame slidable vertically on said guide means, two end rollers rotatably supported by said frame, a reversible motor for driving one of said rollers and a conveyor belt trained on said rollers, and

computerized means for controlling said horizontal conveyor belts, said lift and said oven in the manner that upon a customer selecting a product to be eaten hot, said lift is positioned with its conveyor belt in alignment with the respective storage conveyor belt on which the selected product is stored, said respective storage conveyor belt and said lift conveyor belt are operated to transfer said product onto said lift, said lift is raised to the level of said oven, said lift conveyor belt and said oven conveyor belt are operated to transfer said product into said oven, said oven door is closed and said oven is turned on, after a selected time said oven is turned off, said oven door is opened, said oven conveyor belt and said lift conveyor belt are operated in reverse to transfer said now heated product onto said lift, said lift is lowered to the level of said delivery conveyor belt and said lift conveyor belt and delivery conveyor belt are operated to transfer said product to said delivery opening, and upon a customer selecting a product to be eaten cold, said lift is positioned with its conveyor belt in alignment with the respective storage conveyor belt on which the selected product is stored, said respective storage conveyor belt and said lift conveyor belt are operated to transfer said product onto said lift, said lift is brought to the level of said delivery conveyor belt and said lift conveyor belt and said delivery conveyor belt are operated to transfer said product to said delivery opening.

4,687,120
METHOD AND APPARATUS FOR DISPENSING COLD BEVERAGE

John R. McMillin, Maplewood, Minn., assignor to The Cornelius Company, Anoka, Minn.

Continuation of Ser. No. 453,183, Dec. 27, 1982, abandoned.
This application Sep. 27, 1985, Ser. No. 781,158
Int. Cl.[4] B67D *5/56*
U.S. Cl. 222—1 **38 Claims**



1. Cold beverage dispensing apparatus powerable by compressed gas, comprising:

(a) a thermally insulated cabinet having a cooling chamber containing

(1) a refrigeration evaporator

(2) a source of compressed gas

(3) a water reservoir sized to hold a plurality of servings of water,

(4) a non-pressurized syrup tank sized to hold a plurality of servings of syrup, said tank having a breather to atmosphere within the cabinet, and

(5) a normally non-pressurized syrup pump having a syrup inlet in fluid communication with the syrup tank;

(b) a normally closed water valve fluidly connected to an outlet of the reservoir;

(c) a dispensing nozzle on the outside of the cabinet, said nozzle being fluidly connected to the syrup pump and the water valve;

(d) a pneumatic dispensing power valve having an inlet connected to the source of compressed gas, an outlet connected to the syrup pump, a vent, and a valve element having a normal position in which the valve inlet is closed and the syrup pump is fluidly connected through the valve outlet to the vent, said valve element being selectively movable to an alternate dispensing position in which the inlet is fluidly connected to the outlet and the source of compressed gas is fluidly connected to the syrup pump, and in which the vent is closed;

(e) a manually operable dispensing actuator on the outside of the cabinet, said actuator being operatively connected to move the valve element to the dispensing position

(f) the power valve outlet has a flow restrictor upstream of a gas line connecting the power valve to the pump, said

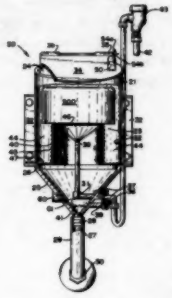
gas line being frictionally connected to both the power valve and the pump.

4,687,121

SOLID BLOCK CHEMICAL DISPENSER FOR CLEANING SYSTEMS

Copeland, James L., Burnsville, Minn., assignor to Ecolab Inc., St. Paul, Minn.

Filed Jan. 9, 1986, Ser. No. 817,399
Int. Cl.[4] B67D *5/08*
U.S. Cl. 222—64 **20 Claims**



1. A dispenser for dispensing an aqueous chemical solution of substantially constant concentration from a solid block of chemical retained within a container; the chemical retained within the container such that the chemical and container move as a single unit during dispensing, which comprises:

(a) a spray means for directing a uniform solvent spray such that the solvent impinges an exposed surface of the solid block of chemical; and

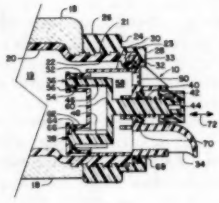
means for supporting the solid block of chemical which, during dispensing of the entire solid block of chemical, maintains a constant distance between the spray means and the exposed surface of the solid block of chemical while the distance between the spray means and the container decreases.

4,687,122

SELF-BLEEDING BUNG DISPENSER VALVE

Eugene L. Bothun, Loveland, and Brent S. Hine, Lakewood, both of Colo., assignors to Sit-N-Sip, Inc., Denver, Colo.

Filed Sep. 20, 1985, Ser. No. 778,211
Int. Cl.[4] B67D *3/00*
U.S. Cl. 222—183 **8 Claims**



1. Container seat apparatus, comprising:

a liquid container with a bung valve extending into the interior of the container from the exterior;

an insulated shell covering the container in the shape of a seat;

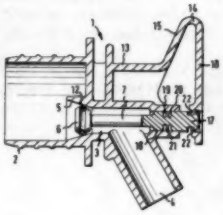
a bung valve positioned in said bung hole, said bung valve including a valve body enclosing a chamber, a first conduit and a second conduit both extending from the interior side of the valve body into said chamber, said second conduit being positioned above said first conduit, a first elongated valve stem positioned longitudinally moveable in said first conduit with a first seal mounted on one end of said first valve stem and positioned to seal against the interior side of the valve body, a second elongated valve stem positioned longitudinally moveable in said second conduit with a second seal mounted on one end of the second valve stem and positioned to seal against the interior side of the valve body, a button actuator slideably mounted in said valve body and connected to the other ends of both of said first and second valve stems in such a manner that movement of said button actuator causes simultaneous longitudinal movement of both of said first and second valve stems, spring means between said button actuator and said valve body for normally biasing said first and second seals in closed position against the valve body, an air vent extending from the exterior side of the valve body into the top of the chamber, and a spout extending from the bottom of said chamber to the exterior side of said valve body.

4,687,123

LIQUID DISPENSING TAP

Roger J. Hyde, Kettering, England, assignor to Alumasc Limited, Kettering, England

Filed Nov. 5, 1984, Ser. No. 667,995
Claims priority, application United Kingdom, Nov. 8, 1983, 8329810; Dec. 1, 1983, 8332166
Int. Cl.[4] B67D *3/00*
U.S. Cl. 222—518 **11 Claims**



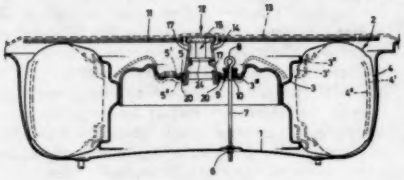
1. A tap, for dispensing liquid from a vessel, the tap having a body to fit an outlet from the vessel, said body having a dispensing mouth and a seat for a valve housed in the body, said valve comprising a valve head and stem and being spring-loaded to close downstream against said seat and manually displaceable to open upstream, said stem extending downstream of said seat and passing as a sliding seal fit through a guide in the wall of said body, a valve-closing spring formed integrally with said body and engaged with said stem outside the path for flow of dispensed liquid, said body being moulded from plastics material, said spring comprising a resilient arm projecting from said body and engaged under stress and with said valve stem, said arm having an elbow forming a resilient hinge between said body and a free end of said arm engaged with said valve stem, said arm being an integral extension from a cross-flange of a T-flanged shoulder on said body, and part of said arm, extending laterally of said body from said flange to said elbow, providing a counter-surface, for engagement by fingers of a user's hand, facilitating manual depression of the free end of said arm engaged with said valve stem.

4,687,124

COVER FOR A MOTOR VEHICLE SPARE WHEEL

Josef Mahr, Cologne, Fed. Rep. of Germany, assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 16, 1985, Ser. No. 809,661
Int. Cl.[4] B62D 43/00
U.S. Cl. 224—42.24 5 Claims



1. A cover for a motor vehicle spare wheel with a center hub bore comprising:

a circular cover plate with a central aperture; and

a fastening device, inserted through said central aperture, for securing said cover plate to said wheel comprising:

a bearing flange in contact with said cover plate;

a plurality of spreading arms extending from said bearing flange into said center hub bore with each of said arms having a guide pin projecting from an inwardly extending bracket; and

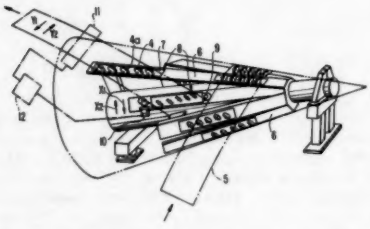
a manually rotatable spreading cam assembly for biasing said spreading arms outwardly into contact with said center hub wherein said cam is rotated, said cam assembly being provided with guide slots for engaging said guide pins.

4,687,125

APPARATUS FOR CHANGING THE TRAVELING DIRECTION OF A WEB-LIKE MATERIAL

Kazuyoshi Hashimoto; Tsuneo Nakano; Kazutoyo Arita; Goro Fukuyama, and Yoshio Shimosato, all of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 622,263, Jun. 19, 1984. This application Jan. 15, 1986, Ser. No. 819,973
Int. Cl.[4] B65H 23/038, 23/32, 27/00
U.S. Cl. 226—21 1 Claim



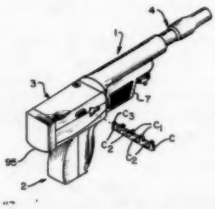
1. As apparatus for changing the traveling direction of a web-like material, comprising a plurality of lines of small individual guide rollers, the guide rollers in each line being spaced along one of a plurality of parallel spiral curves extending along an imaginary conical surface, corresponding rollers in the parellel lines being in sets with each set having rollers lying at spaced intervals along one of a plurality of generatricies of the imaginary conical surface, support members lying along said generatricies and each having one respective set of rollers rotatably mounted thereon about axes intersecting the respective spiral curves at right angles to the curves, an imaginary spiro-conical surface formed by an imaginary surface enveloping said guide rollers and tangent to the outer peripheries of said guide rollers being a traveling path for the web-like material with said rollers rotating in the direction of said traveling path at the points of support for the web-like material, at least one of said support members having a first and second end being pivotally mounted at the first end which is remote from the base of said imaginary conical surface for movement of the second end thereof which is toward the base of said imaginary conical surface substantially parallel to a tangent to the conical surface adjacent said second end of the support member, means for sensing the lateral position of the web-like material as it leaves said apparatus, and means connected between said sensing means and said pivotally mounted support member for pivoting said support member to bring the lateral position of the web-like material moving along said traveling path to a predetermined lateral position if the sensed lateral position is different from the predetermined lateral position.

4,687,126

POWER ACTUATED TOOL FOR DRIVING FASTENER

James R. Brosius, and Ralph C. Brosius, both of St. Louis, Mo., assignors to Research Plus, Inc., St. Louis, Mo.

Filed Nov. 21, 1985, Ser. No. 800,610
Int. Cl.[4] B25C 1/12
U.S. Cl. 227—10 26 Claims

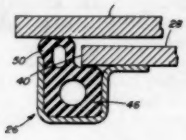


1. A fastener driving tool for use for driving a nail or other anchor into a hardened surface such as a concrete, metal, or the like, said tool useful for feeding a cartridge strip of magazined explosive cartridges through the tool for repeated subsequent driving of a plurality of fasteners into such a surface, said tool including a handle means, a tubular housing provided extending forwardly from said handle means, a barrel cylinder means provided for limited reciprocal movement within said tubular housing, a cartridge chamber provided at the rear of said barrel cylinder means for contiguous reception of a cartridge therein in preparation for firing, a piston provided within the barrel cylinder means and provided for reciprocal movement therein between a set position arranged approximate the back segment of said barrel cylinder means and at its front segment as after a firing and driving of a fastener in place, said barrel cylinder means and piston capable of being reset in preparation for a refiring, a feed housing means operatively associated with the handle means, and barrel cylinder means, and providing an indexing of the cartridge strip through the feed housing means upon the handle means for selective positioning of a next cartridge aligned with the cartridge chamber in preparation for a next firing, indexing means operatively associated with the feed housing means, and an indexing wheel included within the indexing means and provided for the sequential shifting of the magazined cartridges through the tool during usage.

4,687,127
AVIONIC TRAY GASKET ASSEMBLY

Jacob Pardo, Los Angeles, and William S. Jensen, Canoga Park, both of Calif., assignors to Barry Wright Corporation, Newton Lower Falls, Mass.

Filed Mar. 28, 1985, Ser. No. 716,902
Int. Cl.[4] F16J *15/02;* **F16M** *13/00;* **H05K** *7/20*
U.S. Cl. 277—12 **3 Claims**



1. An avionic tray assembly comprising:

a. a tray having upper and lower substantially horizontal surfaces;

b. an opening in the tray to permit the passage of air therethrough;

c. an upwardly opening, U-shaped channel member secured to the lower surface of the tray beneath the peripheral edge of the opening, said U-shaped channel member having inner and outer legs with the inner leg being closer to the center of the opening;

the peripheral edge of the opening being located vertically above a central portion of the U-shaped channel member, whereby a portion of the tray is an overhanging lip above the U-shaped channel member with the outer leg of the U-shaped channel member being under said tray in a plane intersecting the lower substantially horizontal surface of the tray and with the inner leg of the U-shaped channel member being spaced from said peripheral edge; and

d. a gasket located in the U-shaped channel member;

the gasket having a hollow lower portion occupying substantially all of the space within the U-shaped channel member,

a surface on the lower portion of the gasket located beneath the overhanging lip,

a hollow upper portion which is narrower than the lower portion and which extends upwardly from said surface and out of the U-shaped channel member,

the upper portion of the gasket extending above the upper surface of the tray to engage and support an object above the opening in the tray, said inner leg having its upper edge generally opposite said peripheral edge, said gasket having a radially, inwardly facing peripheral surface defining such surface for said upper and lower portions, said inner leg being juxtaposed to and in contact with said peripheral surface for the extent of said inner leg including a part of the peripheral surface of said upper portion,

the characteristics of the seal being such that the object that it is adapted to support remains spaced above the top surface of the tray while slightly compressing in deformation the upper portion of the seal.

4,687,128
POINT-OF-PURCHASE DISPLAY

Roger L. White, Lawrence, Kans., assignor to E and E Specialties, Inc., Lawrence, Kans.

Filed Oct. 3, 1986, Ser. No. 914,890
Int. Cl.[4] B65D *5/36*
U.S. Cl. 229—41 R **9 Claims**

1. A display comprising:

an upright, corrugated board support having a spaced pair of upright, generally flat sheets and a corrugated panel interconnecting said sheets,

said corrugated panel having an alternating series of elongated ridges and elongated grooves with the longitudinal axes of said ridges and grooves being oriented in an upright direction,

said sheets and said ridges and grooves of said support thereby presenting a series of elongated, upright columns;

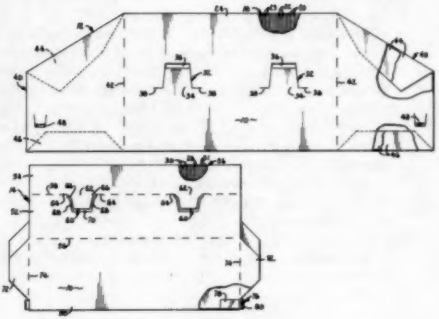
a member formed from corrugated board having a pair of spaced, generally flat sheets and a corrugated panel interconnecting said sheets of said member,

said corrugated panel of said member having an alternating series of elongated ridges and elongated grooves,

said sheets of said member and said ridges and grooves of said member thereby presenting a series of elongated columns,

said member having a shelf portion extending in a generally horizontal direction for supporting articles to be displayed; and

means connecting said shelf portion of said member to said upright support and for enhancing the load carrying capacity of said shelf portion, said means including:



an edge segment formed in said support and extending in a generally horizontal direction in transverse relationship to the longitudinal axes of said column of said support;

an upright portion of said member connected to said shelf portion and disposed in generally parallel, side-by-side relation to said upright support,

the longitudinal axes of said columns of said upright portion being oriented in an upright direction, and

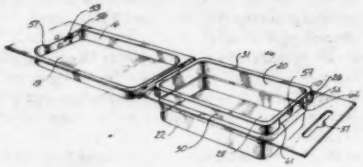
an edge segment formed in said upright portion and extending in a generally horizontal direction in transverse relationhip to the longitudinal axes of said columns of said upright portion,

said edge segment of said upright portion of said member being disposed above said edge segment of said support and directly bearing on said edge segment of said support such that the columns presented by said corrugated board upright portion are in generally parallel, end-to-end, abutting relationship with the columns presented by said upright support whereby the load strength of said connecting means is generally limited only by the longitudinal compressive limit of the columns of said upright portion and said support and lateral bending failure of the columns is substantially precluded.

4,687,129
REUSABLE CONTAINER

Derwyn Cugley, Brea, Calif., assignor to VSI Fasteners, Inc., Stanton, Calif.

Continuation of Ser. No. 773,350, Sep. 6, 1985. This application Jun. 20, 1986, Ser. No. 876,974
Int. Cl.[4] B65D *5/66*
U.S. Cl. 229—44 R **20 Claims**



1. A container formed from a single piece of transparent, moldable sheet material, which comprises:

(a) a first body member having

a first, flat, elongaged flange

a protruding, flat, smooth surface substantially parallel to said flange, and

a female mating region between said flange and said surface;

(b) a second body member having

a second, flat, elongated flange

a raised channel formed within said second flange having an inside sidewall and an outside sidewall

a male mating region which is formed on the outermost surface of said outside sidewall of said raised channel, said male mating region cooperating with said female mating region during closure of said container, and

a recessed chamber formed within the innermost surface of said inside sidewall of said raised channel, said recessed chamber having a second recessed area extending from a first recessed area;

(c) an integral hinge connecting said first body member to said second body member, said hinge enabling said container to open and close; and

(d) a latching means having a first depression located along said male mating region which fits into a second depression located along said female mating region during closure of said container.

4,687,130
DISPOSABLE ICE AND BEVERAGE CONTAINER

Robert J. Beeler, Hanover, Pa., assignor to Beeler Mfg. Co., Hanover, Pa.

Filed Nov. 17, 1986, Ser. No. 931,348
Int. Cl.[4] B65D *5/24*
U.S. Cl. 229—114 **1 Claim**

1. A corrugated fiberboard panel **(10)** having score an cut-lines formed thereon providing means for use of said corrugated fiberboard panel **(10)** as a disposable container device for ice, food or beverages,

wherein said corrugated fiberboard panel comprises:

a rectangular bottom panel **(20)** having first, second, third and fourth sides,

a first side panel **(30)** formed via score line means to lie adjacent a first side of said rectangular bottom panel **(20)**, said first side panel **(30)** a first tab panel means **(31)** formed on one lateral side thereof and a second tab panel means **(32)** formed on an opposite lateral side thereof,

a second side panel **(40)** formed via score line means to lie adjacent a second side of said rectangular bottom panel **(20)**, said second side panel **(40)** having a third tab panel means **(42)** formed on one lateral side thereof and a fourth tab panel means **(41)** formed on an opposite lateral side thereof,

a third side panel **(50)** formed via score line means to lie adjacent a third side of said rectangular bottom panel **(20)**, said third side panel **(50)** having a fifth tab panel means **(51)** formed on one lateral side thereof and a sixth tab panel means **(52)** formed on an opposite lateral side thereof,

a fourth side panel **(60)** formed via score line means to lie adjacent a fourth side of said rectangular bottom panel **(20)**, said fourth side panel **(60)** having a seventh tab panel means **(62)** formed on one lateral side thereof and an eighth tab panel means **(61)** formed on an opposite lateral side thereof,

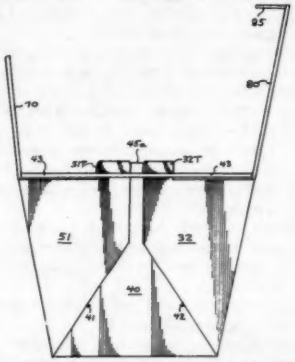
wherein said second tab panel means **(32)** and said third tab panel means **(42)** are attached to each other via score line means formed therebetween,

wherein said fourth tab panel means **(41)** and said fifth tab panel means **(51)** are attached to each other via score line means formed therebetween,

wherein said sixth tab panel means **(52)** and said seventh tab panel means **(62)** are attached to each other via score line means formed therebetween,

wherein said eighth tab panel means **(61)** and said first tab panel means **(31)** are attached to each other via score line means formed therebetween,

wherein said first tab panel means **(31)** has a tab **(31T)** formed at an outer edge thereof and being remotely located with respect to said first side panel **(30)**, and wherein each of the remaining tab panel means **(32, 42, 41, 51, 52, 62, 61)** have a tab element **(32T, 42T, 41T, 51T, 52T, 62T,**



61T) formed at an outer edge thereof and being remotely located with reference to their respective side panels **(30, 40, 50, 60)**,

wherein said second side panel **(40** hs curved cut-line means **(45)** formed at an outer edge thereof for receipt of tabs formed on the second, third, fourth and fifth tab panels **(32, 42, 41, 51)** upon assembly of the device,

wherein said fourth side panel **(60)** has curved cut-line means **(65)** formed at an outer edge thereof for receipt of tabs formed on the sixth, seventh, eighth and first tab panels **(52, 62, 61, 31)** upon assembly of the device,

wherein said corrugated fiberboard panel **(10)** has top panel covering means **(70, 80)** formed as a part thereof for sealingly closing the disposable container formed upon assembly of the device,

wherein said third side panel **(50)** has a first top panel means **(70)** formed at a lower edge thereof via score line means,

wherein said first top panel means **(70)** has a cut-line means **(77)** formed at an internal edge thereof for receipt of a locking flap **(85)** upon assembly of the device,

wherein said first top panel means **(70)** has open-ended slot means **(71, 72)** formed at an outer edge thereof and being sized so as to easily fit over the tabs formed on the fourth, fifth, sixth and seventh tab panels **(41, 51, 52, 62)** upon assembly of the device,

wherein said first side panel means **(30)** has a second top

panel means (80) formed at an upper thereof via score line means,

wherein said second top panel means (80) has a first slot means (81) formed at a lateral edge thereof and being sized so as to fit over the tabs formed on the sixth, seventh, eighth and first tab panels (52, 62, 61, 31) upon assembly of the device,

wherein said second top panel means (80) has a second slot means (82) formed at a lateral edge thereof and being sized so as to fit over the tabs formed on the second, third, fourth and fifth tab panels (32, 42, 41, 51) upon assembly of the device,

wherein said second top panel means (80) has first and second grasping aperture means (83, 84) formed therein for manual transport of the disposable container formed upon assembly,

wherein said second top panel means (80) has locking flap means (85) formed at an outer edge thereof for interaction with the cut-line means (77) formed in said first top panel means (70) upon assembly and closure of the disposable container,

and wherein top supporting flap means (43, 63) are formed at the outer edges of said second side panel (40) and said fourth side panel (60) respectively and are adapted to be folded outwardly upon assembly to retain adjacently positioned tab elements and to serve as a support for lateral portions (76, 76*a*, 86, 86*a*) of the first top panel means (70) and the second top panel means.

4,687,131

SPRING WHIP DEFENSIVE MECHANISM HAVING MEANS TO PERMIT DISASSEMBLY THEREOF

Harold von Braunhut, No. 1 Chapmans Landing Rd., Bryans Road, Md. 20616

Filed Jun. 10, 1985, Ser. No. 743,294

Int. Cl.[4] B68B *11/00*; A45B *9/04*; A63B *59/00*

U.S. Cl. 231—2 R **19 Claims**

1. A knock down spring whip assembly comprising:

a hollow housing serving as a handgrip and providing an internal storage compartment;

at least two elongated members of sequentially increasingly larger diameter size for telescopic arrangement into a coaxial subassembly slidably insertable into said storage compartment, at least one of said elongated members being a helically wound spring;

engaging means to provide for a wedging engagement of said elongated members in an extended whipping position when projecting from a first end of said housing;

means preventing said subassembly from passing entirely through said first end of said housing;

closure means permitting said subassembly to be removed from said housing at an opposite second end of said housing, said closure means including a removable closure unit for plugging said second end;

a weighted tip having a circular seat receiving a distal end of the elongated member with the smallest diameter, said tip and said engaging means preventing said elongated member with the smallest member from being disassembled from the adjacent elongated member with a larger diameter;

removal means permitting said tip to be removed from said distal end of said elongated member with the smallest diameter so that said subassembly can be disassembled into its component parts;

said closure unit including retaining means for retaining said subassembly in said telescopic arrangement within said storage compartment; and

said housing including constraining means projecting into said storage compartment adjacent said first end to abut against an ultimate loop turn of said spring to prevent said spring from returning into said storage compartment when in said extended whipping position, said spring being the elongated member with the largest diameter;

whereby said closure unit, said component parts of said subassembly, said tip and said hollow housing can all be disassembled from each other and replaced.

4,687,132

ENGINE COOLING FAN COUPLING SYSTEM CONTROLLED IN CONCERT WITH A COOLING SYSTEM THERMOSTAT

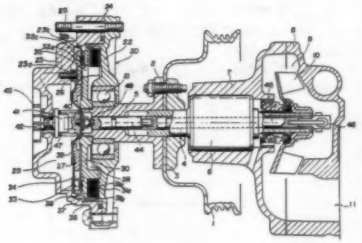
Shunkichi Suzaki; Toshiaki Shirai; Hisanobu Adachi, all of Toyota; Masaharu Hayashi, Kariya; Kenji Hattori, Kariya, and Yoshinari Takakura, Kariya, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota and Aisin Seiki Kabushiki Kaisha, Kariya, both of, Japan

Filed Apr. 9, 1986, Ser. No. 849,954

Claims priority, application Japan, Apr. 12, 1985, 60-54672[U]

Int. Cl.[4] F16D *35/00*

U.S. Cl. 236—35 **3 Claims**



1. A cooling fan coupling system for an engine for an automotive vehicle, said engine comprising a rotating member and a coolant circulation system comprising a coolant radiator, a cooling fan for propelling air past said radiator to cool said coolant radiator, and a thermostatic valve for controlling flow of coolant through said coolant radiator, said thermostatic valve being constituted to start to open at a first determinate coolant temperature value, to be fully opened at a second determinate coolant temperature value, and to be partly opened at a third determinate coolant temperature value which is intermediate said first determinate coolant temperature value and said second determinate coolant temperature value, said cooling fan coupling system comprising:

(a) a first member rotationally coupled to said rotating member of said engine;

(b) a second member rotationally coupled to said cooling fan;

(c) means for providing rotational coupling between said first member and said second member, the degree of said rotational coupling being lower when a first control valve is closed an higher when said first control valve is opened, and also being lower when a second control valve is closed an higher when said second control valve is opened;

(d) means for opening said first control valve when the temperature of the air which is passing said radiator is higher than a determinate air temperature value, and for closing said first control valve when the temperature of the air which is passing said radiator is lower than said determinate air temperature value; and

(e) means for opening said second control valve when engine coolant temperature rises from below a fourth determinate coolant temperature value to above said fourth determinate coolant temperature value, and for closing said second control valve when engine coolant temperature drops from above a fifth determinate coolant temperature value to below said fifth determinate coolant temperature value, said fifth determinate coolant temperature value being substantially lower than said fourth determinate coolant temperature value;

(f) said fourth and fifth determinate coolant temperature values being substantially higher than said third determinate coolant temperature value, said fourth determinate coolant temperature value differing from said third determinate coolant temperature value by a first determinate temperature difference, and said fifth determinate coolant temperature value differing from said third determinate coolant temperature value by a second determinate temperature difference;

(g) said first determinate temperature difference being substantially greater than said second determinate temperature difference; and p1 (h) said fifth determinate coolant temperature value being higher than said second determinate coolant temperature value.

4,687,133

METHOD AND DEVICE FOR OPERATION OF A HEATING PLANT

Johan H. Karlstedt, Sibeliusbulevard, Borga 06100, Finland

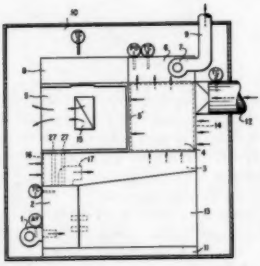
PCT No. PCT/SE84/00388, § 371 Date Jul. 11, 1985, § 102(e) Date Jul. 11, 1985, PCT Pub. No. WO85/02247, PCT Pub. Date May 23, 1985

PCT Filed Nov. 14, 1984, Ser. No. 757,836

Claims priority, application Sweden, Nov. 14, 1983, 8306259-6

Int. Cl.[4] G05D *23/00*

U.S. Cl. 237—2 B **10 Claims**



1. A method of heating a fluid medium utilizing a heating plant located within a room wherein the heating plant includes an outside air intake and an exhaust duct system in which a suction fan is located in order to exhaust air from within the room, a heat exchanger, a heat pump having a medium heating means, a mixed air inlet, an exhaust outlet, and an evaporator through which the mixed air passes, and a boiler having a burner which is selectively operated with the exhaust gases therefrom being vented through the exhaust duct system comprising the steps of:

(a) Passing a mixture of outside intake air and air from within the room through the heat exchanger and into the mixed air inlet of the heat pump;

(b) Preheating the mixture of outside intake air and air from within the room as it passes through the heat exchanger by utilizing other air from within the room which is being exhausted through the exhaust duct system;

(c) Passing the preheated mixture of outside intake air and room air in heat exchange relationship with the evaporator and exhausting the air into the room;

(d) Maintaining an air flow rate through the heat pump at a greater rate than the air flow rate being exhausted through the exhaust duct system whereby the pressure within the room is greater than the pressure within the air duct system.

4,687,134

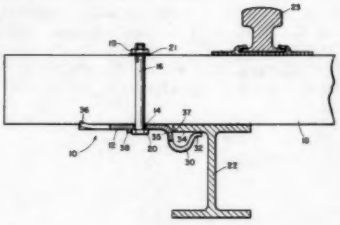
RAILWAY FASTENING

Gar W. N. Burwell, Madison, N.J., assignor to Rails Company, Maplewood, N.J.

Continuation of Ser. No. 314,557, Oct. 26, 1981, abandoned. This application Mar. 28, 1986, Ser. No. 845,486

Int. Cl.[4] E01D *19/12*; E01B *9/30*

U.S. Cl. 238—349 **12 Claims**



1. A railway fastening for use in combination with a cross-tie and a supporting girder having a flange comprising:

(a) a resilient clip including a longitudinal substantially planar body portion having an opening to receive a bolt extending through the cross-tie, an end spaced from said opening and engageable with the flange of the supporting girder and another end engageable with the cross-tie;

(b) a compression arch in said end spaced from said opening for resiliently engaging said flange said arch includes a shoulder portion adapted to engage a side of said flange, to laterally restrain said cross-tie;

(c) a pair of ears in the tie-engaging end to laterally restrain the cross-tie; and

(d) means to tension said bolt to resiliently secure said clip to said cross-tie and said flange.

4,687,135

DETONATION-GAS APPARATUS FOR APPLYING COATINGS

Vasily A. Nevgod; Alexandr P. Garda, and Valery K. Kadyrov, all of Kiev, U.S.S.R., assignors to Institut Problem Materialovedenia Akademii Nauk Ukrainskoi SSR, Kiev, U.S.S.R.

Filed May 9, 1986, Ser. No. 861,572

Int. Cl.[4] B05B *1/24*

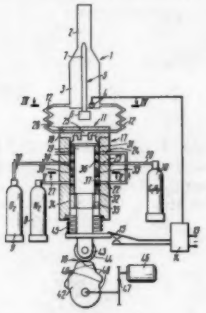
U.S. Cl. 239—81 **6 Claims**

1. A detonation-gas apparatus for applying coatings to surfaces of bodies, comprising:

(a) a barrel having an outlet;

(b) a spark plug accommodated inside said barrel;

(c) sprayer means for supplying powder materials to the inside of said barrel;
(d) sources of fuel gas, oxidizing gas and inert gas;
(e) gas flow restricting means for restricting the flow of fuel gas, oxidizing gas and inert gas to said barrel;
(f) an ignition system connected with the spark plug for actuating the spark plug to detonate said gases in said barrel;
(g) gas distribution means connected to said gas sources for distributing said gases through said gas flow restricting means to said barrel in a four-phase cycle in the order of said inert gas, said fuel and oxidizing gases, and said inert gas and shutting off the supply of all gases to said barrel, said gas distribution means including:
(i) a hollow cylinder extending in a lengthwise direction and open at opposite ends thereof;



(ii) radial ports arranged in three rows spaced along the lengthwise direction of the cylinder for providing communication between the interior of the cylinder and the gas sources;
(iii) a headpiece connected at a first open end of the cylinder, said headpiece including passage means for conveying the gases from the interior of the cylinder through the gas flow restricting means to the barrel; and
(iv) a single piston reciprocably arranged in the interior of the cylinder in the lengthwise direction thereof; and
(h) cam means for actuating the piston to selectively open and close the radial ports so as to selectively supply the gases to the interior of the cylinder and thereby to said barrel in said four-phase cycle, and to control the ignition system to actuate the spark plug to detonate the gases in the barrel.

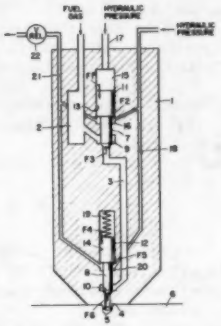
4,687,136

GAS INJECTION VALVE FOR GAS ENGINE

Tadahiro Ozu; Nobuyoshi Nakayama, and Tatsuo Fujii, all of Kobe, Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Hyogo, Japan

Filed Dec. 30, 1985, Ser. No. 814,723
Claims priority, application Japan, Feb. 15, 1985, 60-29110
Int. Cl.[4] F02M *47/04*
U.S. Cl. 239—8 X **7 Claims**

1. A gas injection valve for injecting gas into a combustion chamber of a gas engine, said injection valve comprising:
an injection valve body having a nozzle chamber with nozzle holes for thus injecting fuel gas into a combustion chamber, means forming a first gas passage for introducing fuel gas into said body, and means forming a second gas passage having an upstream end communicable with said first gas passage and a downstream end communicable with said nozzle chamber;
a first needle valve disposed between said first and second gas passages for closing and opening communication therebetween;
a second needle valve disposed between said second gas passage and said nozzle chamber for closing and opening communication therebetween;
actuating means for applying forces respectively for urging said first and second needle valves in the closing direction thereof;
hydraulic actuating means for applying forces respectively urging said needle valves in the opening directions thereof; and
means for, upon said second needle valve being prevented from closing, whereby said second gas passage is exposed to the reduced pressure of the combustion chamber, automatically moving said first needle valve to the closed



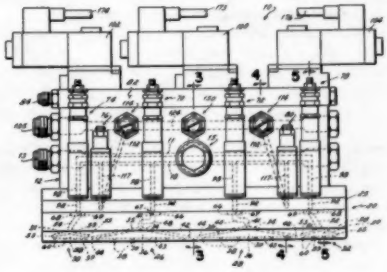
position thereof and thereby preventing further supply of fuel gas to said nozzle holes, said automatic moving means comprising said first needle valve having at an extreme tip end thereof a pressure receiving face which is disposed within said second gas passage and exposed to the pressure therein in the closed position of said first needle valve, and said force applied by said actuating means to move said first needle valve in said closing direction thereof being greater than the sum of said reduced pressure in said second gas passage and said force of said hydraulic actuating means to move of said first needle valve in said opening direction thereof.

4,687,137

CONTINUOUS/INTERMITTENT ADHESIVE DISPENSING APPARATUS

Bentley J. Boger, Atlanta, and Peter J. Petrecca, Dunwoody, both of Ga., assignors to Nordson Corporation, Amherst, Ohio

Filed Mar. 20, 1986, Ser. No. 841,587
Int. Cl.[4] B05B *1/16*; B05C *5/00*
U.S. Cl. 239—124 **11 Claims**



1. Apparatus for applying hot melt adhesive upon a substrate, comprising:

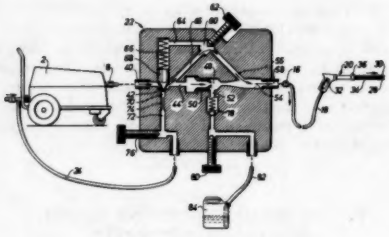
an applicator head;
means for connecting a source of hot melt adhesive to said applicator head;
a slot nozzle mounted to said applicator head for dispensing hot melt adhesive upon a substrate, said slot nozzle being formed with at least one first section having a plurality of spaced, discharge orifices, and at least one second section having a plurality of spaced discharge orifices;
said first and second sections of said slot nozzle each having at least one fluid flow passageway forming a pair of runners connected at one end to the source of hot melt adhesive and extending outwardly at an angle relative to one another, and a triangular-shaped slot interconnecting said runners with said discharge orifices;
means for supplying hot melt adhesive continuously to said first section of said slot nozzle, the hot melt adhesive being dispensed upon the substrate in continuous, parallel beads from said discharge orifices of said first section of said slot nozzle;
means for intermittently supplying hot melt adhesive to said second section of said slot nozzle, the hot melt adhesive being dispensed upon the substrate in non-continuous, parallel beads from said discharge orifices of said second section of said slot nozzle.

4,687,138

DEVICE IN OR FOR HIGH-PRESSURE CLEANING UNITS FOR HEATING THE WATER BY CIRCULATION

Tage V. Ostergaard, Hadsund, Denmark, assignor to Knud Erik Westergaard, Hadsund, Denmark

Filed Nov. 21, 1984, Ser. No. 673,922
Claims priority, application Denmark, Nov. 25, 1983, 5389/83
Int. Cl.[4] B05B *9/03*
U.S. Cl. 239—126 **2 Claims**



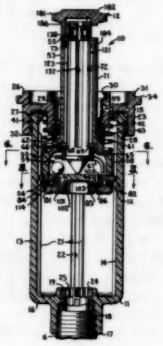
1. High-pressure cleaning apparatus having two operating modes comprising:
an ejection nozzle for discharging fluid;
a high-pressure pump having delivery and suction sides;
a return conduit between said delivery and suction sides of said pump and having a constricted portion for generating heat during the passage of fluid therethrough;
a non-constricted bypass connection between said delivery and suction sides of said pump;
a bypass valve responsive to a total interruption of water delivery from said delivery side of said pump for producing a bypass through sid non-constricted bypass connection;
conduit means, including a shut-off valve, for communicating with said delivery side of said pump and with said ejection nozzle when said shut-off valve is open, thereby setting the apparatus in a first operating mode;
means responsive to pressure in said conduit means for blocking any return flow through said constricted conduit portion when any discharge of fluid through said ejection nozzle is blocked when the apparatus is in said first operating mode, said pressure-responsive means comprising a differential pressure valve for feeding fluid downstream from said delivery side of said pump when said apparatus is in a second operating mode; and
a pressure-loss-causing nozzle coupled to said differential pressure valve;
said shut-off valve being effective, when closed and thereby setting the apparatus in said second operating mode, to close said conduit means, causing discharge fluid to flow through said pressure-loss-causing nozzle when said ejection nozzle is open;
said blocking means being responsive to the pressure differential across said pressure-loss-causing nozzle for unblocking return flow through said constricted portion of said return conduit for heating the fluid flowing therethrough when the apparatus is in said second operating mode;
said blocking means being effective to block return flow through said constricted portion of said return conduit when said ejection nozzle is closed when the apparatus is in said second operating mode.

4,687,139

BALL DRIVE SPRINKLER

James F. Lockwood, Lenexa, Kans., assignor to Imperial Underground Sprinkler Co., Lenexa, Kans.

Filed May 3, 1985, Ser. No. 730,174
Int. Cl.[4] B05B *15/10*
U.S. Cl. 239—205 **35 Claims**



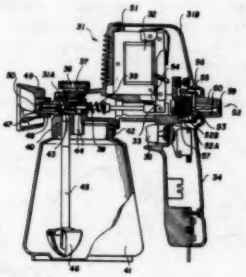
1. A sprinkler, which comprises:
(a) a container including a container bore and a water inlet for admitting water to said container bore;
(b) a motor reciprocably received in said container bore and movable between retracted and extended positions, said motor including:
(1) a stator having a stator bore with upper and lower ends and a stator base receiving water from said container bore; and
(2) a rotor rotatably received within said stator bore, said rotor including upper and lower ends, a vertical rotational axis and a turret having an inlet orifice communicating water with said stator bore and a nozzle orifice;
(c) hydraulic drive means adapted for rotating said rotor;
(d) a stabilizer ring associated with said stator bore lower end and rotatably receiving said rotor;
(e) a stator water inlet associated with said stabilizer ring and adapted to communicate water between said stator base and said stator bore; and
(f) bumper means associated with said rotor base and being adapted to engage said stabilizer ring.

4,687,140

SPRAYING APPARATUS

Kyohei Hasegawa, Nagaoka, Japan, assignor to Nippon Seiki Co., Ltd., Nigata, Japan

Filed Oct. 8, 1985, Ser. No. 785,605
Claims priority, application Japan, Jul. 30, 1985, 60-168130
Int. Cl.[4] B05B *9/04*
U.S. Cl. 239—332 **6 Claims**



1. A spraying apparatus comprising:
a main body;
a solenoid held in the main body;
an armature associated with the solenoid so as to be vibrated when the solenoid is energized;
a spraying mechanism including a cylinder, a piston fitted into the cylinder and a nozzle;
a mechanism for reciprocating the piston within the cylinder by the agency of the vibration of the armature to suck a liquid into the cylinder and to spray the sucked liquid through the nozzle;
an adjusting member screwed into the main body so that the depth of engagement thereof with the main body is variable so that the amplitude of vibration of the armature is adjusted by varying the depth of engagement of the adjusting member with the main body; and
a regulating member with a generally cylindrical aperture that fits around the adjusting member in any of several angularly spaced relative positions with respect thereto and makes said regulating member rotatable therewith in a predetermined angular juxtaposition about a common rotational axis, with a projection formed on the regulating member and a projection formed in the main body, said regulating member projection coacting solely with said main body projection to define the range of turning of the adjusting member and thus define predetermined limits of turning of the adjusting member in both directions, whereby corresponding maximum and minimum amplitudes of said armature vibration, and hence the flow rates of liquid spray corresponding to said maximum and minimum amplitudes, are determined.

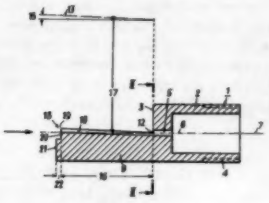
4,687,141

JET NOZZLE

Othmar Kriegner, St. Valentin; Franz Lang, Linz; Günter Holleis, Linz; Karl Schwaha, Linz, and Fritz Gränitz, Linz, all of Austria, assignors to Voest-Alpine International Corporation, New York, N.Y.

Filed Jul. 13, 1984, Ser. No. 630,592
Claims priority, application Austria, Jul. 26, 1983, 2718/83
Int. Cl.[4] B05B *1/26*; B22D *11/124*
U.S. Cl. 239—520 **13 Claims**

1. A cooling arrangement for the cooling of continuous casting plants with fluid jets comprising
rollers forming part of a continuous casting plant for supporting cast material;
a jet nozzle body disposed adjacent to said rollers and having at least two nozzle channels disposed next to each other with parallel axes and the hydraulic diameter of the nozzle channels can range from about 1.5 to 4 millimeters;
a concave guide surface for guiding the jet exiting from the nozzle with the nozzles merging stepless into the guide surface and where the axes of the nozzle channels and the guide surface include an angle of from about 0.5 to 5 degrees and wherein the guide surface is formed as a



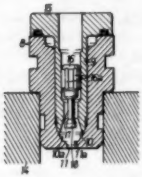
cylinder jacket surface, where the axis of this cylindrer jacket surface is outside of the jet nozzle body and wherein the jet of cooling agent is directed substantially in parallel to a roller of the continuous casting plant for substantially sheilding the rollers from heat radiating off the cast material; and
a break provision with a cutting edge disposed at the guide surface.

4,687,142

FUEL INJECTION VALVE WITH FLUID HONED DISCHARGE PORT AND ASSOCIATED METHODS OF PRODUCTION

Isamu Sasao, Kakuda, and Yoshiyasu Takaoka, Urawa, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo; Kabushiki Kaisha Keihinseiki Susakusko, Kawasaki, both of Japan

Filed Nov. 20, 1984, Ser. No. 673,499
Claims priority, application Japan, Nov. 30, 1983, 58-224408
Int. Cl.[4] F02M *39/00*
U.S. Cl. 239—533.3 **6 Claims**



1. A method for producing a smooth finish on the surfaces of a valve seat and a discharge port of a fuel injection valve which includes:
a main fuel injection valve body;
a valve rod slidable in the main fuel injection body and having an end with a valve body; and
a valve seat-forming member attached to said main fuel injection valve body and having a guide bore for receiving the valve rod, a fuel discharge port through which fuel flows for discharge from the injection valve, the fuel discharge port having a bounding surface and being opened and closed by the valve body of the rod and a valve seat between said guide bore and said fuel discharge port, said valve seat having a surface which is contacted by the valve body;
the method comprising forming a smooth finish on said

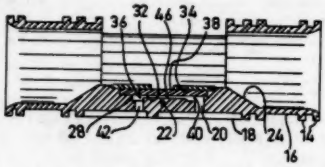
surface of the valve seat and on said surface of the discharge port by fitting a socket member provided with an inlet and an outlet for a honing fluid into the guide bore of the valve seat-forming member with the valve seat-forming member separated from the valve to cover the surface of the guide bore and provide a passage for said honing fluid extending from said inlet to said outlet, fitting a guide member having a peripheral surface provided with guide grooves into said socket member, and thereafter discharging said honing fluid against said surface of the valve seat and said surface of the discharge port from the outlet of the socket member while confining the flow of the honing fluid to pass through said guide grooves and preventing the fluid from acting on the surface of the guide bore.

4,687,143

DRIP IRRIGATION APPARATUS

Moshe Gorney, and Eldad Dinur, both of Kibbutz Naan, Israel, assignors to Naan Mechanical Works, Naan, Israel

Filed Jan. 10, 1986, Ser. No. 817,917
Claims priority, application Israel, Oct. 3, 1985, 76553
Int. Cl.[4] A01G *25/16*
U.S. Cl. 239—542 **12 Claims**



1. Pressure responsive volume-controlled drip irrigation apparatus comprising:

a drip irrigation element defining a volume control region having a peripheral edge surface along at least part of the periphery thereof and a side wall;

a flexible membrane having an inner facing surface disposed along said side wall and an opposite surface communicating with a source of pressurized water, the volume control region being bounded by the side wall, the peripheral edge surface and the inner facing surface of the flexible membrane and defining a volume control region outlet at said peripheral edge surface and a volume control region inlet spaced from said volume control region outlet;

a flow restricting pathway having a pathway inlet communicating with the source of pressurized water and a pathway outlet communicating with the volume control region at said volume control region inlet, and a water outlet communicating with the volume control region outlet, whereby water exiting the flow restricting pathway passes through the volume control region and exits via the water outlet and the location of the volume control region outlet at the peripheral edge surface prevents the volume control region outlet from becoming blocked by the flexible membrane when exposed to water pressures within the operating range of the drip irrigation apparatus.

4,687,144

APPARATUS FOR COMMINUTING WASTE MATERIALS

Jere F. Irwin, Yakima; John R. Doornink, Wapato, both of Wash., and Clive J. Roberts, Wincham, United Kingdom, assignors to Irwin Research & Development, Inc., Yakima, Wash.

Filed Jun. 13, 1986, Ser. No. 874,151
Int. Cl.[4] B02L *23/32*
U.S. Cl. 241—49 **12 Claims**

1. Apparatus for comminuting waste material into pieces having a size less than a predetermined size, comprising:

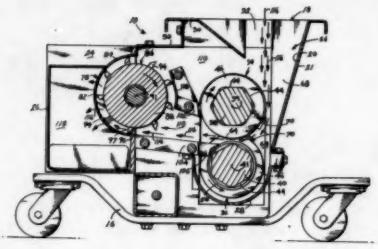
a frame having an enclosure with an entrance opening for receiving the waste material;

a set of overlapping scissor rolls rotatably mounted on the frame for shearing the waste material into smaller pieces as the material is passed between the scissor rolls;

feed means for recieving the material from the entrance and directing the material between the scissor rolls;

a screen mounted on the frame within the enclosure downstream of the scissor rolls for permitting undersized smaller pieces of a size less than the predetermined size to pass therethrough and for preventing oversized smaller pieces of a size greater than the predetermined size from passing therethrough;

a recycle conveying means movably mounted on the frame within the enclosure for directing the smaller pieces over



the screen and for recycling the oversized smaller pieces back to the feed means;

drive means operatively connected to the scissor rolls and the conveying means for rotating the scissor rolls to shear the material into progressively smaller pieces during each pass of the material between the scissor rolls and for moving the conveying means to direct the smaller pieces over the screen to permit the undersized smaller pieces to pass through the screen and to continually recycle the oversized smaller pieces back to the feed means until the smaller pieces are reduced to undersized small pieces; and

vacuum means for drawing air into the enclosure to form an air current and drawing the air current through the screen to entrain the undersized pieces passing through the screen therein and conveying the undersized pieces from the enclosure.

4,687,145

ROLL-AND-RACE PULVERIZER WITH ROTATING THROAT

Donald R. Dougan, North Canton; Gerald W. Peters, Canal Fulton, and William C. Kish, Akron, all of Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.

Filed Dec. 12, 1985, Ser. No. 808,130
Int. Cl.[4] B02C *15/06*
U.S. Cl. 241—57 **3 Claims**

1. An improved roll-and-race pulverizer comprising:

a housing;

a grinding ring mounted in the housing with an annular opening between the ring and the housing;

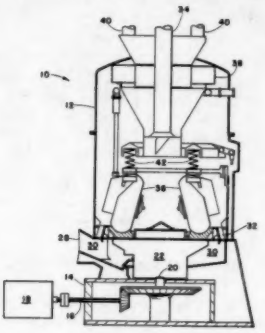
means for rotating the grinding ring in the housing about a vertical axis;

roll means operative in the ring for pulverizing material fed to the ring;

means for directing a stream of air into the housing and upwardly through the annular opening;

a pulverizer throat, contained within the annular opening and having a configuration defined by a circular outer throat wall having an inlet radius of curvature R1, a circular inner throat wall having an inlet radius of curvature R2, a throat ledge cover, and airfoil vanes, said vanes having a teardrop shape at a lower end and an airfoil shape

on a portion of an upper end of a length L1, said upper end having a constant thickness, said vanes radially extending within the annular opening across the radial width thereof and at circumferentially spaced locations between succesaine vanes such that a ratio of the airfoil length L1 to a minimum distance between vanes D2 is greater than 1.0 and less than 5.0, and such that a ratio of the radii of curvature R1 and R2 to the radial width of the annular



opening is greater than 0.5 and less than 1.5, and wherein the vanes vertically extend within the annular opening at an angle from the horizontal with their upper ends in advance with respect to the direction of rotation of the ring; and

means for circumferentially rotating the vanes within the annular opening in the direction of rotation of the grinding ring.

4,687,146

APPARATUS FOR FIBERIZING AND SCREENING OF FIBROUS MATERIALS

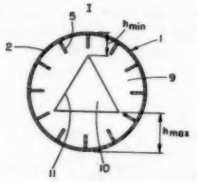
Frey Sundman, Karhula, Finland, assignor to A. Ahlstrom Osakeyhtio, Noormarkku, Finland

Filed Apr. 12, 1982, Ser. No. 367,179

Claims priority, application Finland, May 22, 1981, 811588

Int. Cl.⁴ B02C *13/13*

U.S. Cl. 241—79.3 **6 Claims**



1. An apparatus for fiberizing and screening fibrous material, which comprises a drum (1) rotating about a horizontally extending central longitudinal axis, the drum having, two end walls, a side wall interconnecting said two end walls, an inlet end, (7) and an outlet end (8), said side wall being non-perforated at the inlet end (7), said side wall being perforated at the outlet end (8) and the inlet end being separated from the outlet end (8) by means of a first partition wall (9) that extends perpendicularly to said longitudinal axis of the drum, said partition wall having a non-circular opening in the center thereof, so that said longitudinal axis passes through said opening (10), the opening having an edge, wherein the distance from the edge of the opening to the side wall of the drum, along a non-rotating radius which is fixed relative to said longitudinal axis, while the drum is rotating, varies from a maxiumum to a minimum a fixed number of times during a complete revolution of the drum, and wherein the retention time in said non-perforated inlet end increases when the volume flow rate in the inlet end decreases.

4,687,147

FIBER-BALE MILL

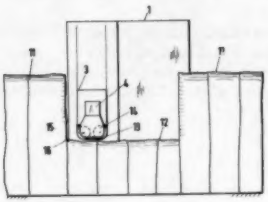
Hubert A. Hergeth, Kockerellstrasse 3, 5100 Aachen, Fed. Rep. of Germany

Filed Jan. 24, 1986, Ser. No. 821,995

Claims priority, application Fed. Rep. of Germany, Feb. 2, 1985, 3503522

Int. Cl.⁴ D01G *7/04, 7/06*

U.S. Cl. 241—101 A **7 Claims**



1. In a device for plucking fiber bales mounted in a row into fibers or fiber tufts by a milling cutter member traveling over said row and comprising at least one cutter roller, wherein said cutter member is surrounded by a grid up to at least the height of the axis of said cutter roller, said cutting member having only a single roller and said grid is substantially concentric to the outer periphery of said cutter roller below said axis of said cutter roller.

4,687,148

APPARATUS AND PROCESS FOR FORMING A THREAD-RESERVE WINDING

Edmund Schuller, Ingolstadt; Günther Böhm, Kipfenberg, and Rupert Karl, Ingolstadt, all of Fed. Rep. of Germany, assignors to Schubert & Salzer, Ingolstadt, Fed. Rep. of Germany

Continuation of Ser. No. 679,264, Dec. 7, 1984, abandoned. This application Apr. 30, 1986, Ser. No. 869,816

Claims priority, application Fed. Rep. of Germany, Dec. 9, 1983, 3344645

Int. Cl.⁴ B65H *54/02, 54/34, 65/00*

U.S. Cl. 242—18 PW **11 Claims**

1. A process for forming a thread-reserve winding on a bobbin tube having an inside diameter defining an interior thereof and an associated bobbin plate with an integral centering shoulder which extends into said inside diameter, said process comprising the steps of:

providing a thread draw-off pipe and thread suction device with said suction device in the vicinity of said bobbin plate, said pipe and said suction device defining a thread path therebetween;

providing a thread-catching device associated with said bobbin plate, said thread-catching device including at least one slit formed between the periphery of said bobbin plate and said centering shoulder thereof;

providing a thread severing device within said thread suction device;

providing controllably movable first and second thread guide elements adjacent said thread path;

providing thread in said thread path and extending into said thread suction device;

controllably rotating the bobbin tube about its axis;

simultaneously moving said first and second thread guide elements into said thread path so as to engage said thread

to form a thread portion located between said thread guide elements;

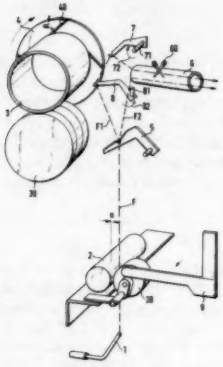
presenting said thread portion to said thread catching device in a disposition approximately parallel to the rotation axis of said bobbin tube;

catching said thread portion by means of said slit and simultaneously severing with said thread severing device said thread extending into said thread suction device so as to form a free thread end hanging out from said slit;

forming a thread-reserve winding by guiding said thread by moving said second thread guide element away from said bobbin plate and in a direction towards the bobbin tube center, while rotating said bobbin tube and plate;

moving said second guide element back towards said bobbin plate while continuing said rotation of said bobbin tube and plate so as to wind thread over said thread-reserve winding; and

drawing said thread caught in said slit to the bottom of said slit adjacent said centering shoulder and conveying said free thread end into said interior of said bobbin tube during winding of thread on said bobbin tube, whereby said



thread end is reliably secured and protected within said bobbin tube.

6. An apparatus for forming a thread-reserve winding on a bobbin tube and reliably securing an end of such thread reserve, comprising:

a bobbin tube having at least one end, and respective outside and inside diameters;

a substantially circular bobbin plate having a radius greater than that of said bobbin tube outside diameter;

means for generally engaging said bobbin plate with said bobbin tube end so as to permit slight relative rotation therebetween;

means for rotating said bobbin plate and tube, with a resulting slight relative rotational movement therebetween, and with said plate leading said tube; and

means, operative during rotation of said bobbin tube and plate, for receiving and drawing a thread end in between said bobbin plate and tube, and for further conveying said end, during relative rotation of said plate and bobbin, into an area within said tube inside diameter, where said end is reliably secured and protected for subsequent piecing to another thread end.

4,687,149

DELIVERY DEVICE FOR CONTINUOUS THREADS

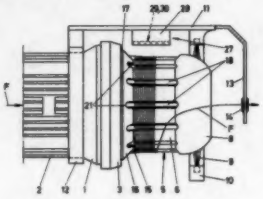
Ermete Riva, I-Pagnana di Merate, Italy, assignor to Sobrevin Société de brevets industriels-Etablissement, Vaduz, Liechtenstein

Filed Feb. 14, 1986, Ser. No. 829,663

Claims priority, application Fed. Rep. of Germany, Feb. 23, 1985, 3506490

Int. Cl.[4] B65H *51/20*

U.S. Cl. 242—47.01 8 Claims



1. A delivery device for continuous threads, comprising

a storage member,

means including a rotary drive for feeding thread to said storage member in circumferential direction, the thread being stored on said member with a predetermined adjustable number of thread turns as a storage quantity between a feed point and a withdrawal point, the thread being withdrawn from the storage member therefrom,

means comprising a light monitor including a receiver, for scanning a circumferential surface of the storage member and controlling said rotary drive for feeding the thread for determining the number of thread turns such that the speed of rotation of the rotary drive is continuously controlled as a function of intensity of light measured at the receiver,

the light monitor is formed as a light-monitor strip which extends approximately over a thread storage length of the storage member, and wherein

said light monitor includes a light transmitter, said light transmitter includes means for initiating a light intensity of the transmitter which is variable over the storage length of the storage member.

4,687,150

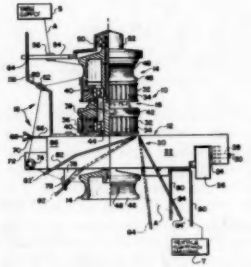
STRAND STORING AND DELIVERING DEVICE

Alan Gutschmit, P.O. Box 708, Troy, N.C. 27371

Filed Oct. 4, 1985, Ser. No. 784,626

Int. Cl.[4] B65H *51/20*

U.S. Cl. 242—47.01 15 Claims



1. A device for transiently storing and delivering a traveling strand to a textile machine or the like, comprising strand storage means having rotatable first and second circumferential portions about and from each of which said strand may be

wound and unwound, means for rotatably driving said first and second circumferential portions synchronously, means for guiding said strand to travel in sequence a plurality of windings about said first circumferential portion and a plurality of windings about said second circumferential portion, and stop motion means for monitoring said strand intermediate said first and second circumferential portions for detecting breakages in said strand without any tension-loss-sensitive stop motion means upstream of said first circumferential portion, said first circumferential portion and said plurality of strand windings thereabout being arranged to isolate said stop motion means from tension variations in said strand upstream of said first circumferential portion and said stop motion means being arranged to detect breakages in said strand upstream of said first circumferential portion essentially only upon exhaustion of said plurality of strand windings thereabout, whereby said stop motion means detects only actual upstream breakages of said strand.

4,687,151

TEXTILE YARN PULL-OFF SYSTEM

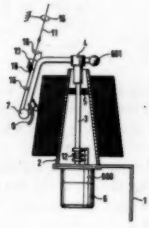
Gustav Memminger, Heideweg 65, D-7290 Freudenstadt, and Erich Roser, Bermatingen, both of Fed. Rep. of Germany, assignors to Gustav Memminger, Freudenstadt, Fed. Rep. of Germany

Filed Jul. 26, 1985, Ser. No. 759,662

Claims priority, application Fed. Rep. of Germany, Aug. 8, 1984, 3429193

Int. Cl.[4] B65H *49/02, 49/06, 49/18*

U.S. Cl. 242—54 R **21 Claims**



1. Textile yarn removal and pull-off system to remove and pull off yarn (**11**) from a spool (**10**) and supply the yarn to a knitting feed of a knitting machine, as required by the knitting feed, having

a stationary support means (**1**);

a spool support element (**2**) supported on the support means;

a flyer arm element (**4**) located to remove yarn tangentially from the spool,

at least one of said elements (**2, 4**) being rotatable with respect to said support means (**1**);

a yarn guide means (**16**) secured to the flyer arm element to guide yarn removed from the spool and direct yarn to the knitting feed,

a speed controllable electric drive motor (**6, 6'**) drivingly coupled to the at least one of said elements (**2, 4**) which is rotatable;

a yarn pull-off speed sensing means (**7, 9**), secured to the flyer arm element having the yarn coupled thereto in slip-free manner and providing a yarn speed signal representative of the speed of yarn (**11**) being removed from the spool by said knitting feed at a speed determined by said knitting feed;

a control circuit means (**33–38**); and

coupling means (**30, 31**) connected to said yarn pull-off speed sensing means for coupling the yarn speed signal to the control circuit means,

said control circuit means (**33–38**) being coupled to the coupling means (**30, 31**) and receiving the yarn speed signal,

said control circuit means being further connected to said motor, and controlling the speed of operation of said motor (**6, 6'**) for controlling the output speed of the motor as a function of the speed of yarn sensed by the speed sensing means (**7, 9**) to control the motor speed as a function of the yarn speed signal, and

wherein the yarn (**11**), the yarn pull-off—speed sensing means (**7, 9**), the drive motor (**6**) and the at least one rotatable element (**2, 4**) coupled to the motor form a closed control loop.

4,687,152

MACHINES FOR HANDLING ELECTRICAL COMPONENTS

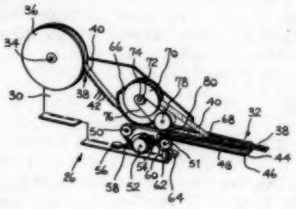
Victor T. Hawkswell, Essex, England, assignor to USM Corporation, Farmington, Conn.

Filed May 30, 1986, Ser. No. 865,505

Claims priority, application United Kingdom, May 28, 1985, 8513297

Int. Cl.[4] B65H *75/02, 20/22*

U.S. Cl. 242—55 **9 Claims**



1. A machine for handling electrical or electronic components comprising a tape supply magazine for supporting a reel about which is wound a tape carrying electrical components spaced apart by regular intervals, a sprocket wheel having regularly spaced sprocket pins engaging regularly spaced sprocket holes in the tape (unwound from the reel), a drive belt arranged to rotate the sprocket wheel to feed the tape in the operation of the machine, a drive wheel arranged to move the belt to rotate the sprocket wheel in the operation of the machine, and drive means to cause the drive wheel to rotate through a predetermined angle in the operation of the machine to thereby feed the tape a predetermined distance equal to the distance by which the components are spaced apart on the tape.

4,687,153

ADJUSTABLE SHEET LENGTH/ADJUSTABLE SHEET COUNT PAPER REWINDER

Kevin B. McNeil, Maineville, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

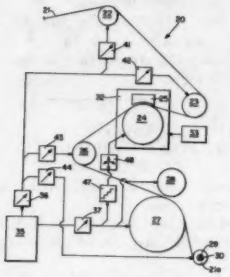
Filed Jun. 18, 1985, Ser. No. 746,154

Int. Cl.[4] B65H *16/10, 35/10*

U.S. Cl. 242—56.8 **4 Claims**

1. In an improved paper converting rewinder of the type which includes means for continuously unwinding successive parent rolls of paper and forwarding the paper through the rewinder, means including a perforator cylinder for providing transverse lines of perforations across the paper at product sheet length intervals in the machine direction to define product sheets of the paper, means including a bedroll and a chopper roll having means for breaking the paper along lines of the perforations which lines are product roll length spaced in the machine direction to define product roll lengths of the paper consisting of a predetermined count of the product sheets, means for initiating such breaking of the paper each time said

bedroll completes a predetermined number of whole revolutions, and means for winding each product roll length of the paper on a tubular core to thereby make successive product rolls of the paper, the improvement comprising means for adjusting sheet length and means for effecting integer changes in sheet count per said product roll without changing either the



perforation cylinder or the bedroll, said means for adjusting sheet length and a sheet count comprising means for independently controlling the velocity of said paper relative to the surface velocities of said perforator cylinder and said bedroll, and for enabling said paper to slip relative to the surfaces of said perforator cylinder and said bedroll.

4,687,154

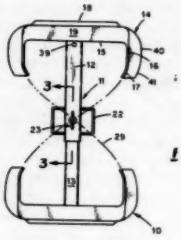
DEVICE FOR HANDLING AND STORAGE OF EXTENSION CORDS AND THE LIKE

Richard A. Deweese, Knoxville, Tenn., assignor to University of Tennessee Research Corporation, Knoxville, Tenn.

Filed Nov. 21, 1985, Ser. No. 800,466

Int. Cl.[4] B65H *75/40*

U.S. Cl. 242—96 **1 Claim**



1. A lightweight frame for handling and storing cord or the like in a figure eight configuration comprising:

a telescoping backbone having two ends;

a transversely extending arcuate end piece fastened to each end of said telescoping backbone;

each of said arcuate end pieces having a middle section with two ends;

said middle section having a bottom, a front wall, and a rear wall to define a U-shaped channel sufficient in size to accommodate a stored cord or the like;

said middle section rear wall having an outer edge which is straight to permit standing of the frame without rolling;

a tangent section extending from each of said ends of said arcuate end pieces in a direction parallel to said telescoping backbone;

each of said tangent sections having only a rear wall and a bottom with said bottom having a width approximately the same width as said bottom of said middle section;

an inward curved section extending from each of said tangent sections in a direction toward the center of said frame;

each of said inward curved sections having only a bottom and a rear wall;

a projection leg extending forwardly from said bottom of said inward curved section to serve both to increase the width of said bottom of said inward curved section and to serve as a support for said frame when it is placed face down on a horizontal surface; and

an open handle-shaped transversely extending footplate affixed to said backbone at approximately the middle thereof to serve both as a carrying handle and a hold down for said frame when a cord or the like is being wound thereon.

4,687,155

TAPE MEASURE

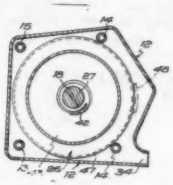
Stan Burton, Rayleigh, England, assignor to Fisco Products Limited, Rayleigh, England

Filed Mar. 5, 1986, Ser. No. 836,636

Claims priority, application United Kingdom, Mar. 7, 1985, 8505847

Int. Cl.[4] B65H *75/48*

U.S. Cl. 242—107.3 **20 Claims**



1. In a tape measure of the kind having a case, a coilable measuring blade, a rotary carrier for coiling the blade upon, pivot means for journalling the carrier within the case, and a return spring to turn the carrier and retract the blade into the case by winding the blade onto the carrier, so that an assembly consisting of the carrier and a part of the blade wound thereon is rotating in the case during retraction of the blade,

the improvement which comprises

means to cause rotational unbalance of the said rotating assembly of the carrier and part of the blade wo und thereon,

structure within the case adjacent the carrier,

said carrier being constructed and journalled by said pivot means such as to permit at least part of said assembly to wobble relative to said structure during rotation of said assembly,

whereby when said return spring imparts sufficient speed to said rotating assembly during retraction of the blade, the rotational unbalance of said assembly induces said wobble, such that the assembly makes contact with said adjacent structure, and is thereby frictionally retarded.

4,687,156

LOCK MECHANISM FOR WEBBING RETRACTOR

Shinji Mori, Aichi, Japan, assignor to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho, Aichi, Japan

Filed Mar. 27, 1986, Ser. No. 844,584

Claims priority, application Japan, Mar. 29, 1985, 60-46251

Int. Cl.[4] A62B *35/02;* **B65H** *75/48*

U.S. Cl. 242—107.4 A **20 Claims**

1. A lock mechanism for a webbing retractor employed in a seatbelt system for a vehicle designed to protect an occupant in an emergency situation of the vehicle, said mechanism comprising:

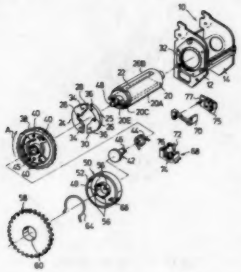
(a) a take-up shaft for winding up said webbing by means of a biasing force;

(b) a lock ring having teeth thereon and adapted to rotate together with said take-up shaft when rotated in a direction in which said webbing is unwound;

(c) stopper means adapted to engage with said lock ring when the acceleration acting on the vehicle exceeds a predetermined value, so as to delay the rotation of said lock ring with respect to the rotation of said take-up shaft in the direction in which said webbing is unwound;

(d) lock means for stopping the rotation of said take-up shaft in the direction in which said webbing is unwound when the rotation of said lock ring has adequately been delayed with respect to the rotation of said take-up shaft; and

(e) a ratchet wheel to which the rotation of said take-up shaft is transmitted through friction in such a manner that said



ratchet wheel is rotatable together with said take-up shaft without applying any resistance to the rotation of said take-up shaft, said ratchet wheel having teeth thereon and being adapted to be engaged with said stopper means when the acceleration acting on the vehicle exceeds a predetermined value and before said stopper means engages with said lock ring, so that, when said ratchet wheel in this state is rotated in the direction in which said webbing is wound up, said ratchet wheel pushes out said stopper means so as to disengage from said lock ring, whereby, even when said webbing is repeatedly unwound and rewound, said lock ring and said stopper means are allowed to engage with each other at a substantially constant position, thereby preventing said webbing from being gradually wound up and tightened.

4,687,157

TAPE CASSETTE, IN PARTICULAR A VIDEO CASSETTE, AND A PRESSURE SPRING FOR THIS

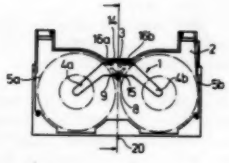
Klaus Schoettle, Heidelberg; Artur Buhk, Erpolzheim; Eugen Kamm, Appenweier; Heinz Berger, Kehl, and Dieter Gaiser, Rheinau, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Dec. 18, 1985, Ser. No. 810,203

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1984, 8437534[U]

Int. Cl.[4] G03B *1/04*; G11B *15/32*

U.S. Cl. 242—199 **7 Claims**



1. A tape cassette, in particular a video tape cassette, having a housing including rear-, front- and side-walls and enclosing two coplanar tape reels and a pressure spring for said tape reels, said pressure spring and said two tape reels being arranged symmetrically with respect to the transverse central plane of said housing, said housing having at least two parts connected together by a connecting means including a connecting pin lying in said transverse central plane, and said pressure spring having substantially the shape of a V formed by two arms joined to a central part,

wherein on the pressure spring there are provided anchoring means comprising

a bent-up edge portion extending from said central part and

a cutout on the side of said central part opposite said bent-up edge portion,

whereby, upon insertion of said spring into said housing, said spring is clamped between said front wall and said connecting pin, with said bent-up edge portion bearing against said front wall and said cutout bearing against said connecting pin.

4,687,158

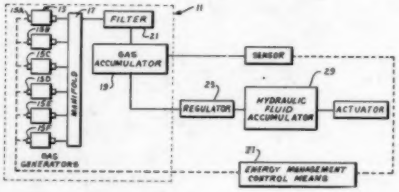
JUMP STRUT LANDING GEAR APPARATUS AND SYSTEM

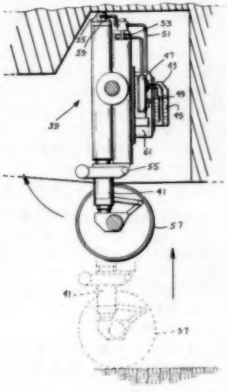
Charles W. Kettering, Marietta, Ga., assignor to Lockheed Corporation, Calabasas, Calif.

Filed Jul. 15, 1985, Ser. No. 754,837

Int. Cl.[4] B64D *25/22*

U.S. Cl. 244—63 **5 Claims**





1. A jump strut landing gear apparatus for an aircraft comprising:

(a) a fluid generator for generating a predetermined quantity of compressed fluid having a known energy;

(b) a fluid accumulator for accumulating the compressed fluid to a predetermined pressure;

(c) a hydraulic accumulator for receiving the compressed fluid at said predetermined pressure;

(d) an extendable landing gear strut driven by said hydraulic

accumulator to impart a predetermined vertical acceleration to the aircraft; and

(e) an adjustable energy management control means for controlling the quantity of compressed fluid generated by said fluid generator to control the vertical acceleration imparted to the aircraft by said extendable landing gear strut, and including input means for manually inputting a desired acceleration quantity in accordance with the gross weight of the aircraft and desired takeoff distance, said adjustable energy management control means further being adapted to monitor aircraft performance sensors and utilizing data generated by said sensors in order to control said quantity of compressed fluid generated by said fluid generator.

4,687,159

PNEUMATIC DEICERS WITH INEXTENSIBLE THREADS

Pedro W. Kageorge, Cuyahoga Falls, Ohio, assignor to The B. F. Goodrich Company, New York, N.Y.

Filed Feb. 22, 1985, Ser. No. 704,369

Int. Cl.[4] B64D *15/18*

U.S. Cl. 244—134 A **8 Claims**

1. A pneumatic deicer adapted to be secured with respect to the leading edge of an aircraft wing, said deicer including

a deformable sheet formed of a cloth substrate with a coating of fluid-impervious, resilient material secured to the outer face of said substrate remote from the aircraft wing; and

a series of essentially inextensible threads formed essentially only into said cloth in spaced, parallel relationship corresponding to regions of said sheet adapted not to be deformed and with the regions of said deformable sheet between said inextensible threads adapted to be deformed, the inextensible threads do not to attach the deformable sheet to any surface there underlying, other than, at edge portions of the deformable sheet where desired.

4,687,160

PARACHUTE SYSTEM

Horst Logemann, Hillscheidt, Fed. Rep. of Germany, assignor to Bruggemann & Brand GmbH & Co. KG, Wetter Ruhr, Fed. Rep. of Germany

PCT No. PCT/EP85/00151, § 371 Date Mar. 11, 1986, § 102(e) Date Mar. 11, 1986, PCT Pub. No. WO86/00593, PCT Pub. Date Jan. 30, 1986

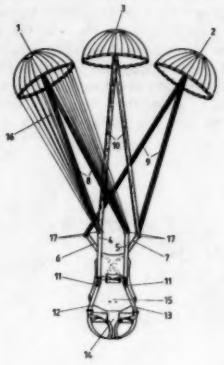
PCT Filed Apr. 3, 1985, Ser. No. 847,173

Claims priority, application Fed. Rep. of Germany, Jul. 12, 1984, 3425651

Int. Cl.[4] B64D *17/06*

U.S. Cl. 244—142 **4 Claims**

1. Parachute system comprising three separate parachutes (1–3) with shroud lines (16), together with the associated three-point harness (14), a canopy separating lock (11) being provided both on the left-hand (12) and right-hand (13) supporting strap, articulation straps (4–7) with articulation points (17) for the shroud lines (16) being fitted to said lock (11), together with a packing sleeve containing a packing sack, characterized in that there are two articulation straps (4–7) for each canopy separating lock (11) and substantially all of the shroud lines of each of the three parachutes are combined in each case to form two partial bundles (8–10) being fixed to said straps in such a way that the two partial bundles of the first parachute (1) are articulated to two of said articulation straps and the two partial bundles of the second parachute (2) to the other two of said



articulation straps, and that of the two partial bundles of the third parachute (3) one is also articulated to one of the articulation straps to which one partial bundle of the first parachute (1) is articulated and the other to one of the articulation straps to which one partial bundle of the second parachute (2) is articulated.

4,687,161

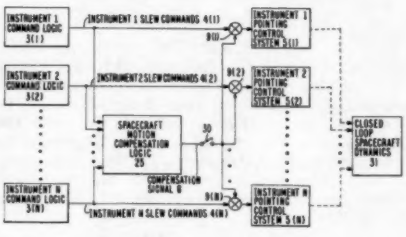
POINTING COMPENSATION SYSTEM FOR SPACECRAFT INSTRUMENTS

Carl T. Plescia, Sunnyvale, and Donald W. Gamble, Palo Alto, both of Calif., assignors to Ford Aerospace & Communications Corporation, Detroit, Mich.

Filed Sep. 30, 1985, Ser. No. 802,121

Int. Cl.[4] B64G *1/36*

U.S. Cl. 244—171 **5 Claims**


INSTRUMENT 1 COMMAND LOGIC 3(1)
INSTRUMENT 1 SLEW COMMANDS 4(1)
INSTRUMENT 1 POINTING CONTROL SYSTEM 5(1)
INSTRUMENT 2 COMMAND LOGIC 3(2)
INSTRUMENT 2 SLEW COMMANDS 4(2)
INSTRUMENT 2 POINTING CONTROL SYSTEM 5(2)
SPACECRAFT MOTION COMPENSATION LOGIC 29
COMPENSATION SIGNAL B
CLOSED LOOP SPACECRAFT DYNAMICS 31
INSTRUMENT N COMMAND LOGIC 3(N)
INSTRUMENT N SLEW COMMANDS 4(N)
INSTRUMENT N POINTING CONTROL SYSTEM 5(N)

1. A system for reducing spacecraft instrument pointing errors caused by instrument-motion-induced spacecraft motion, said system comprising:

at least one instrument mounted on a spacecraft and disposed to point towards locations external to the spacecraft;

coupled to each instrument, motive means for changing the pointing direction of the instrument;

coupled to each motive means, commanding means for commanding motion in the instrument; and

compensating means for compensating errors in spacecraft motion induced by instrument motion, said compensating means having an output coupled to each of the motive means and an input coupled to each of the commanding means, wherein the compensating means sends to each of

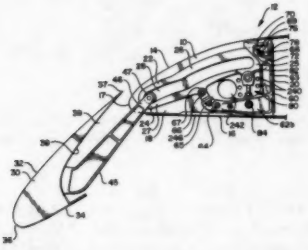
the motive means a signal representative of the negative of the spacecraft motion expected as a result of motion in the instruments commanded by the commanding means.

4,687,162

APPARATUS FOR SUPPORTING AN AIRCRAFT GUIDE TRACK FOR A MOVABLE AIRFOIL

Edward N. Johnson, and Miloslav Puncoch, both of King County, Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Jun. 25, 1985, Ser. No. 748,749
Int. Cl.[4] B64C 9/02
U.S. Cl. 244—213 **24 Claims**



18. Apparatus for attaching a support assembly for a movable airfoil member to a wing, said apparatus comprising:

a. positioning means having a first end which is connected to said support assembly and a second end;

b. locating means which are movably engaged to said positioning means and which are movable along an adjustment axis to a location where said locating means are at a first selected distance from said first end of said positioning means; and

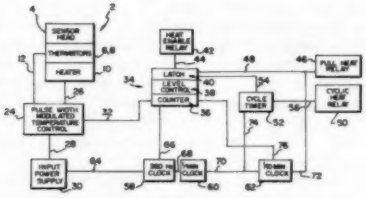
c. base means including (i) connecting means which are operatively connected to said wing, (ii) retaining means which engage said locating means so as to position said support assembly at a first selected location relative to said wing, and (iii) engaging means which are movable between a first position where said engaging means are disengaged from said locating means and a second position where said engaging means are in engagement with said locating means to restrict said movement of said locating means along said adjustment axis so as to maintain said first selected distance between said positioning means first end and said locating means and to maintain said support assembly at said first selected location.

4,687,163

RAILWAY SWITCH CONTROL SYSTEM

Thomas R. Ringer, Gloucester, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Canada

Filed Aug. 10, 1984, Ser. No. 639,414
Claims priority, application Canada, Sep. 23, 1983, 437465
Int. Cl.[4] E01B 7/24
U.S. Cl. 246—428 **2 Claims**



1. A railway switch control system for a railway switch having a first heating means for providing heat in the region of said railway switch and switching means for switching said first heating means off and on comprising:

(a) probe means located near said railway switch,

(b) temperature sensing means comprising a thermistor forming one arm of a measuring bridge network and having a characteristic whose value is proportional to the temperature of said probe means,

(c) second heating means to provide heat to said probe means to maintain said probe means at a substantially constant temperature,

(d) control means for controlling the electrical power supplied to said second heating means to maintain the probe temperature substantially constant,

(e) means responsive to said control means to cause said switching means to switch said first heating means off and on in a predetermined mode, and

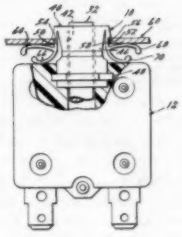
(f) wherein the output of said bridge network, when unbalanced, is fed as a bridge error signal to a comparator means which provides a resultant pulse output to control the operation of said second heating means, the width of said pulse output being a function of said bridge error signal, said pulse output being aslo supplied to a measurement unit to control said first heating means to provide a full cycle of operation or an ON-OFF cycle of operation, the output of said control means being also utilized to control operation of control relays to select operation of said first heating means.

4,687,164

SNAP-IN BUSHING

Kenneth C. Bakhaus, Jackson, and Bruce C. Sdunek, Howell, both of Mich., assignors to Mechanical Products, Inc., Jackson, Mich.

Filed Dec. 1, 1983, Ser. No. 556,976
Int. Cl.[4] G12B 9/00
U.S. Cl. 248—27.3 **1 Claim**



1. A snap-in bushing for mounting an electrical circuit protector in an aperture in a mounting panel, said bushing comprising

a hollow cylindrical mounting sleeve adapted to extend through an aperture in a housing of said circuit protector, said mounting sleeve including a radially outwardly extending annular flange at one end thereof for mechanically securing said bushing to said circuit protector, said bushing having a frontal portion at an opposite end thereof disposed exteriorly of the circuit protector housing with a pair of diametrically spaced arms depending in cantilevered relation therefrom towards the housing and movable toward one another so as to be acceptable within the aperture in said mounting panel, said arms having a pair of positioning shoulders thereon, respectively, engageable with a front surface of said mounting panel, each of said arms having a pair of axially spaced laterally extending resilient fingers one of which is engageable with a back surface of said mounting panel and the other of which is

engageable with a front surface of said circuit protector to position said circuit protector relative to said panel.

4,687,165

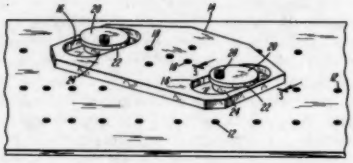
ADAPTER PLATE ASSEMBLY FOR ADJUSTABLE MOUNTING OF OBJECTS

Robert S. Blackburn, Albuquerque, N. Mex., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 2, 1986, Ser. No. 859,167

Int. Cl.[4] E04G *3/00*

U.S. Cl. 248—274 **8 Claims**



1. An object mounting adapter assembly, for securely mounting an object in readily rejustable precise orientation with respect to a mounting surface containing an array of affixation apertures, comprising:

an adapter member, formed to have a base portion having a first surface shaped to contactingly match said mounting surface, said base portion being provided with at least one slot aperture having a length longer than its width, and said adapter member having an object holding portion to securely hold said object mounted thereat;

a generally cylindrical locking member, having a first cylindrical portion with a diameter slightly smaller than said width of said slot aperture and a length smaller than the thickness of said base portion around said slot for freely translating along and rotating within said slot aperture during use; said locking member having a second portion having a dimension, normal to the diameter of the axis of said first cylindrical portion, larger than said width of said slot aperture; and said locking member also having a through aperture offset from and parallel to said axis of said first cylindrical portion thereof; and

connecting means, passing through said aperture in said locking member and at least one of said affixation apertures of said mounting surface, for connecting said adapter member to said mounting surface with said adapter member clamps between said mounting surface and said second portion of said locking member.

4,687,166

SWIVEL ARM

Hermann Poehler, Ober-Morlen, Fed. Rep. of Germany, assignor to MAP Mikrofilm Apparatebau Dr. Poehler GmbH & Co. KG, Ober-Morlen, Fed. Rep. of Germany

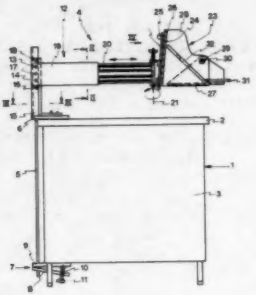
Filed Jul. 30, 1985, Ser. No. 760,553

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1984, 3430565

Int. Cl.[4] E04G *3/03*

U.S. Cl. 248—279 **16 Claims**

1. A swivel arm assembly (for supporting an appliance designed for use on a desk, comprising a pillar adapted to be vertically fixed on a desk, a telescope-type cantilever capable of swiveling about said pillar, a carrying frame for accommodating the appliance being provided at the end of said telescope-type cantilever, said carrying frame being fixed at the



end of the cantilever and being capable of moving in an at least approximately vertical direction in relation to the cantilever.

4,687,167

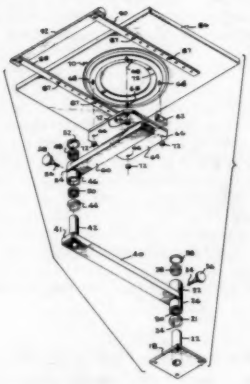
MULTI-POSITION COMPUTER SUPPORT

Gerald P. Skalka, 5027 Cathedral Ave., NW., Washington, D.C. 20016, and Stanley H. Skalka, 9015 Mistwood Dr., Potomac, Md. 20854

Filed Oct. 23, 1985, Ser. No. 790,487

Int. Cl.[4] E04G *3/00*

U.S. Cl. 248—282 **17 Claims**



1. A cantilever support system for supporting a supported item for movement in a horizontal plane above a fixed surface comprising:

base means fixed to said fixed surface and including a first vertical pivot shaft extending upwardly from attachment means on the fixed surface;

first swing arm means including an outer end and an inner end mounted on said base means and including a first vertical pivot sleeve on its inner end fitted over said vertical pivot shaft and engageable therewith by first roller bearing means comprising an upper roller bearing set in the upper end of said first vertical pivot sleeve and a lower roller bearing set spaced substantial distance below said upper bearing set in the lower end of said first vertical pivot sleeve, and further including second vertical pivot shaft means extending upwardly from said outer end of said first swing arm means;

second swing arm means having an outer end and an inner

end, said inner end being pivotally mounted on the outer end of the first swing arm means by a second pivot sleeve and second roller bearing means therebetween;

carrier plate means mounted on the outer end of said second swing arm means;

rotary bearing means attached to and supported by carrier plate means;

support platform means supported by said rotary bearing means to provide a movable support for any item positioned on said support platform means; and

wherein said base means additionally includes a first tubular sleeve bearing fitted over said first vertical pivot shaft and positioned beneath and supportingly engaging the lower end of said first vertical pivot sleeve and additionally including a second tubular sleeve bearing fitted over said second vertical pivot shaft and positioned beneath and supportingly engaging the lower end of said second pivot sleeve.

4,687,168

MOBILE RADIO ANTENNA SUPPORT DEVICES

Herbert E. Rupp, 4761 Anchor Ave., Port Salerno, Fla. 33492

Filed Feb. 9, 1987, Ser. No. 12,288
Int. Cl.[4] A01K *97/10*
U.S. Cl. 248—539 **7 Claims**

1. A device for use in mounting on a boat or other mobile unit a radio antenna of the whip type including an elongated cylindrical base portion which comprises:

a support member and a collar member,

said support member including:

a partial ring portion having an inside surface, an outside surface, and a side opening, and

integral means extending laterally from the side of said partial ring portion opposite to said opening by which said support member may be fixed to a support surface,

said inside surface being tapered inwardly along its length,

said collar member including:

a tubular body having upper and lower ends opening into a bore of diameter approximating the diameter of said cylindrical base portion,

a plurality of integral fingers depending inwardly from said lower end,

an outside tapered section at least as long as said length of said inside surface and having an angle of taper matching that of said inside surface whereby said collar member may nest in said support member, and

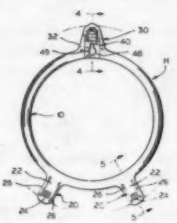
a lug extending laterally from said lower end of said tubular body which serves to lock said tubular body in said support member when nested therein by engagement with said partial ring portion.

4,687,169

PLATE HOLDER

James E. Thomas, 16W67 Timberview Dr., Oak Brook, Ill. 60521

Filed Jul. 21, 1986, Ser. No. 887,743
Int. Cl.[4] A47G *1/16*
U.S. Cl. 248—490 **10 Claims**



1. A unitary, molded plastic holder for supporting and displaying against a vertical surface, such as a wall, a decorative article, such as a plate, said holder comprising:

(a) a relatively thin flat body member in the form of a narrow ring having:

(i) an integral, upper support member projecting radially upward therefrom;

(ii) a pair of integral, lower support members projecting radially downward therefrom;

(b) each of said support members including:

(i) a flange;

(ii) a relatively flexible hook element extending forwardly from said flange and cooperating therewith to receive and retain an edge portion of said article;

(iii) a positioning element extending rearwardly from said flange for engaging said vertical surface and spacing said holder forwardly thereof and generally parallel thereto;

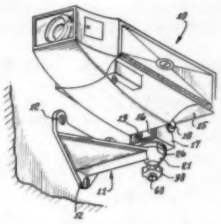
(c) said upper support member also including means for supporting said holder from said vertical surface.

4,687,170

CAMERA MOUNTING BRACKET

Richard C. Beaver, Inglewood, Calif., assignor to American Electronics, Inc., Fullerton, Calif.

Filed Jun. 6, 1986, Ser. No. 871,479
Int. Cl.[4] E04B *3/00*
U.S. Cl. 248—543 **12 Claims**



1. In a mount for a camera for moving between an operating position and a servicing position, the camera having a first support means, the combination of:

a second support means and fastener means for joining together said first and second support means for supporting the camera with said second support means;

a bracket for attachment to a fixed support;

a shaft rotatably positioned in said bracket;

a flange member with a first detent means associated with the second support means;

first clamp means for clamping together said second support means, said flange member and said shaft for moving said shaft with the camera movement, with the position of said flange member being adjustable with respect to the camera to indicate the operating position of the camera;

a second detent means carried by said bracket for engaging said first detent means at the operating position of the camera; and

second clamp means for releasably clamping said shaft in said bracket to prevent shaft and camera movement in the operating position.

4,687,171

MOUNT

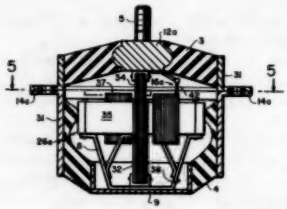
Tillmann Freudenberg, Weiterstadt, Fed. Rep. of Germany, assignor to Firma Carl Freudenberg, Weinheim/Bergstr., Fed. Rep. of Germany

Filed Jan. 2, 1985, Ser. No. 688,186

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1984, 3403002

Int. Cl.[4] F16M *5/00*

U.S. Cl. 248—550 **21 Claims**



1. A mount for connecting two relatively-vibratable objects, comprising:

two resilient elements and a signal-actuated clutch for connecting two relatively-vibratable objects in the direction of the relative vibrations thereof, the clutch being in parallel with one of the resilient elements and in series with the other; and

sensor means responsive to the relative vibrations of the objects at least at a resonant frequency of the mount with a signal for actuating the clutch, thereby to change the transfer function of the mount so as to avoid the resonant frequency of the mount.

4,687,172

COMBINED HANDLE AND LOCKING MECHANISM FOR A DASHBOARD MOUNTED APPARATUS SUCH AS A CAR RADIO

Ola Stillbäck, Hisings Backa, Sweden, assignor to AB Volvo, Goteborg, Sweden

PCT No. PCT/SE85/00434, § 371 Date Jun. 24, 1986, § 102(e) Date Jun. 24, 1986, PCT Pub. No. WO86/02891, PCT Pub. Date May 22, 1986

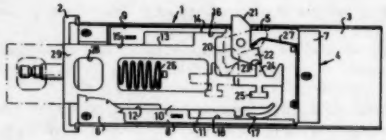
PCT Filed Nov. 5, 1985, Ser. No. 882,973

Claims priority, application Sweden, Nov. 6, 1984, 8405559

Int. Cl.[4] F16M *13/00*

U.S. Cl. 248—551 **8 Claims**

1. In a combined handle and lock mechanism for a dashboard mounted apparatus such as a car radio or the like, comprising a latch member which can be moved into and out of engagement with a cooperating blocking means fixed relative to the dashboard; the improvement comprising a slide guide **(5–9)** to be securely fastened to the apparatus **(1)**, a slide **(10)** displaceably mounted in the slide guide and having a handle-shaped end portion **(29)**, a latch member **(20)** displaceably mounted on the apparatus relative to the slide guide, and interacting portions **(24, 23)** of the slide and the latch member, respectively, which portions, in a predetermined inserted position of the slide into said guide, hold the latch member in a locked position and block the slide against being pushed out, said interacting portions permitting further insertion of the slide beyond said predetermined position to disengage the latch member and permit the slide to be pushed out past said predetermined position to an outer end position in which the handle protrudes outside the slide guide.



4,687,173

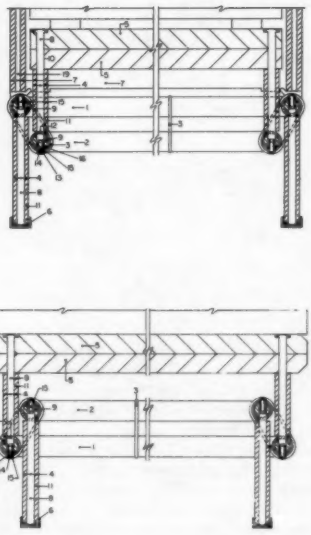
MECHANICAL AND ACOUSTICAL VIBRATION REDUCTION APPARATUS FOR TURNTABLES AND SPEAKER ENCLOSURES

Robert T. Genna, 41 Oakdene Ave., Cliffside Park, N.J. 07010

Filed Feb. 17, 1984, Ser. No. 581,199

Int. Cl.[4] F16M *11/00*

U.S. Cl. 248—603 **2 Claims**



1. Hand balanceable mechanical and acoustical vibration reduction apparatus for vibration sensitive equipment such as turntables and vibration generating equipment such as speaker enclosures comprising:

two concentrically arranged tubing frames, elastically joined around their cross-sectional plane by synthetic rubber rings at predetermined balancing points along the perimeter of said frames;

said synthetic rubber rings being slideable along the surface of said frames allowing fine balance of said apparatus;

on corners of said frames are connected vertical legs which point upward and attach to a base support plate for equipment support on one frame and point downward for table support on another frame;

said synthetic rubber rings are stretched by the displacement of said frames due to the weight of vibration sensitive or vibration generating equipment and perform resilient load carrying and energy dissipating functions;

the ends of said vertical legs for table support have rubber caps to prevent abrasion to table surface;

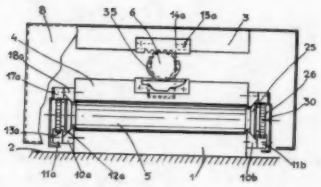
an acoustical vibration reduction cover resting on the upper surface of said concentric frame with downward pointing legs for table support, encloses the upward vertical legs and frame with said equipment sensitive to vibration, isolating said equipment from air-borne sound waves.

4,687,174

DEVICE FOR CENTERING AND GUIDING A ROLLER SUPPORTING A HEAVY COMPONENT

Jean-Louis E. Helary, Nantes, and Pierre Grenon, Treillieres, both of France, assignors to Framatome & Cie., Courbevoie, France

Filed Nov. 19, 1984, Ser. No. 672,748
Claims priority, application France, Nov. 17, 1983, 83 18279
Int. Cl.[4] G21C *17/00*
U.S. Cl. 248—638 **9 Claims**



1. An apparatus for supporting a heavy component comprising:

a lower supporting component resting on the ground and having a substantially horizontal flat upper bearing surface,

an upper supporting component for carrying said heavy component, having a substantially horizontal flat lower bearing surface parallel to and confronting said upper bearing surface,

at least one roller having a cross section other than circular, and a horizontal axis, said roller being in contact with said upper and lower bearing surface for rolling movement along a predetermined direction, and being so shaped as to cause a lifting movement of said upper supporting component upon rolling movement thereof in either direction from a predetermined set position and,

a device for centering and guiding said roller comprising:

on each of said supporting components, a pair of centering surfaces extending in said predetermined direction and having opposite slopes relative to a horizontal plane and at least one rack having a flat guiding surface and extending along said predetermined direction,

each of said centering surface of the upper supporting component being directly above an associated one of the centering surfaces of the lower supporting component and the rack of one of said upper component being directly above the rack of the other component,

and, on said roller,

a pair of roller wheels each having part spherical rolling surface means having an axis in coincidence with said axis of the roller and in rolling contact with two associated ones of said centering surfaces on said upper and lower supporting components, said centering surfaces and roller wheels being shaped to remain in mutual contact upon occurence of said rolling movement,

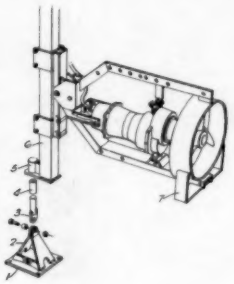
and at least one pinion having a cross section other than circular and being arranged for simultaneous meshing with the racks on said upper and lower components.

4,687,175

ATTACHING DEVICE

Balint Szendroi, Vallingby, and Magnus Eriksson, Johanneshov, both of Sweden, assignors to Flygt AB, Solna, Sweden

Filed May 5, 1986, Ser. No. 859,941
Claims priority, application Sweden, May 14, 1985, 8502389
Int. Cl.[4] F16M *13/00*
U.S. Cl. 248—661 **3 Claims**



1. An attachment device for mounting a guide element within a tank, said guide element for accepting along a longitudinal axis thereof a submersible mixer for maintaining liquids in said tank in a homogeneous condition; said attachment device comprising:

a substantially flat plate;

guide mounting means attached to the guide element, said guide mounting means being configured to be rotatably engaged about an axis of rotation parallel to said longitudinal axis of said guide element; and

support means mounted on said flat plate, said support means including first and second means, said first means for rotatably engaging said guide mounting means and allowing free rotation of said guide mounting means about said axis of rotation, said second means being configured to fully support said guide element and submersible mixer on said flat plate and permitting said flat plate to pivot with respect to said longitudinal axis to enable attachment of said flat plate to vertical, horizontal and sloping surfaces of a tank while said guide element means is disposed in a preferred orientation of said longitudinal axis and said submersible mixer is fully supported and unencumbered with respect to displacement along said longitudinal axis.

4,687,176

FLOW CONTROL VALVE FOR A FLEXIBLE WALLED TUBE

C. Eric Olsen, 5521 Canalino Dr., Carpenteria, Calif. 93013

Filed Jul. 7, 1986, Ser. No. 882,840
Int. Cl.[4] F16K *7/06*
U.S. Cl. 251—9 **11 Claims**

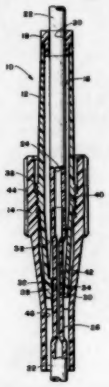
1. A flow control valve for regulating flow of a fluid through a flexible walled tubing, said flexible walled tubing having a rigid body, said flow control valve comprising:

an inner tubular member having a first axial bore, said inner tubular member including deflectable means;

a section of said flexible walled tubing located within said first axial bore, said section having an inner bore, said section being flaccid not having said rigid body, said section assuming a limp at rest position, said section being made flaccid by modifying of said section by treatment causing said section to lose its memory, said deflectable means being located directly adjacent said section; and

a collet having a second axial bore, both said section and said inner tubular member being located within said second axial bore, said collet connecting with said inner tubular

member by engaging means, said engaging means permitting longitudinal movement of said collet relative to said inner tubular member, said collet including cam means, said cam means being in contact with said deflectable means, whereby longitudinal movement of said collet



relative to said inner tubular member is capable of causing said deflectable means to press against said section decreasing the cross-sectional size of said inner bore thereby decreasing the amount of fluid that can pass through said inner bore within a period of time.

4,687,177

DEVICE FOR ADJUSTING THE SWITCHING TIME OF A VALVE MEMBER

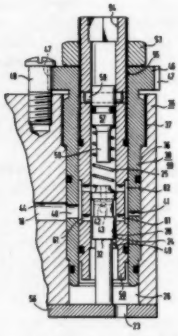
Manfred Härtwig, Ostfildern, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Fed. Rep. of Germany

Filed Jun. 9, 1986, Ser. No. 872,179

Claims priority, application Fed. Rep. of Germany, Jun. 10, 1985, 3520745

Int. Cl.[4] F16K *31/122*

U.S. Cl. 251—25 **10 Claims**



1. A device for adjusting the switching time of a valve comprising an inlet port, an outlet port, a valve member for connecting the inlet port to the outlet port in one position of said valve member and for isolating said inlet port from said outlet portion when said valve member is in another position and a control chamber selectively connected via throttle orifices and a control valve to a control pressure source for urging said valve member to one of its positions or to a reservoir for permitting said valve member to move to the other of its positions, characterized in that a conduit extends from said control valve to said control chamber, a first throttle of relatively large effective cross-section area for controlling the flow in one direction in said conduit and a second throttle in said conduit connected in series with said first throttle, said second throttle being movable from a first position in which said second throttle has a relatively small cross-sectional area for controlling the effective cross-sectional area of said conduit means when said control valve is in one position and a second position wherein said second throttle is substantially unrestricted when said control valve is in a second position wherein said first throttle determines the effective cross-sectional area of said conduit.

4,687,178

WAX RING TUBE WITH GRADUATIONS

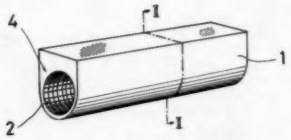
Yasuo Kuramoto, No. 204, Nogiwa Mansion, 17-5, Sengen-cho 2-chome, Higashikurume-shi, Tokyo, Japan

Filed Jan. 31, 1986, Ser. No. 824,781

Claims priority, application Japan, Feb. 7, 1985, 60-16477[U]

Int. Cl.[4] B22C *7/02*; B28B *7/34*

U.S. Cl. 249—53 R **3 Claims**



1. A wax ring tube used in the manufacture of a ring by casting with a lost-wax process, said wax ring tube comprising a body having a circular hole bored lengthwise therein, said hole having an inner peripheral wall surface and a plurality of plotting graduations printed on said inner peripheral wall surface of said hole, said plurality of graduations comprising a first set of parallel printed lines extending axially in said hole and a second set of parallel printed lines extending circumferentially in said hole and intersecting the set of axially extending lines.

4,687,179

AUTOMATIC VALVE ACTUATOR AND CONTROL SYSTEM

Gordon M. Smith, 1851 Chota Rd., La Habra Heights, Calif. 90631

Continuation of Ser. No. 477,084, Mar. 21, 1983, abandoned. This application Nov. 29, 1985, Ser. No. 803,383

Int. Cl.[4] F16K *31/42*

U.S. Cl. 251—58 **5 Claims**

1. An improved remotely controllable actuator control system primarily for use with a plug-type valve and an operator for changing the flow configuration of the valve in response to a source of motive power, the actuator of the type having a source of motive power, means for activating the motive power source in response to a remotely initiated command for changing the flow configuration of the valve, means for sensing the actual flow configuration of the valve and means for deactivating the motive power source when the actual flow configuration of the valve has been changed in accordance with the remotely initiated command; the improvement comprising:

a manifold connected to said motive power source for selectively initiating motion in said source in either of two directions, said manifold having means responsive to said command for initiating motion in said source in a selected one of said two directions, said manifold also having means responsive to said flow configuration of said valve for stopping said selected motion of said source when said flow configuration has changed in accordance with said command;

said flow configuration responsive means comprising at least two independent switching devices;

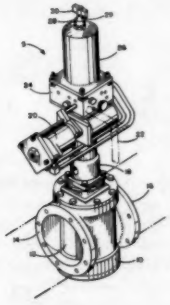
said command responsive means comprising at least two independent power source control devices;

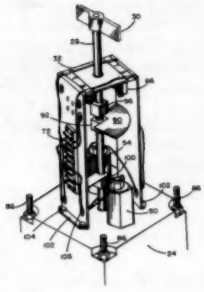
respective switching devices being connected to respective power source control devices to form at least two switching device-control device pairs, each such pair being operative to sequentially initiate and terminate an opposite change in valve flow configuration;

said source of motive power comprising a hydraulic pressure operated device having a rotatable shaft;

said power source control devices comprising solenoid operated hydraulic valves, one such valve connected to a clockwise input hydraulic pressure line of said hydraulic pressure operated device and one such valve connected to a counterclockwise input hydraulic pressure line of said hydraulic pressure operated device;

said switching devices comprising electrical switches, each





such switch connected to one of said solenoid operated hydraulic valves for closing said hydraulic valves respectively, upon actuation of a switch, for blocking hydraulic pressure to said hydraulic pressure operated device;

said remotely initiated command comprising an electrical energy transmitted to each said electrical switch for opening said hydraulic valves respectively, for passing hydraulic pressure to said hydraulic pressure operated device;

said flow configuration responsive means further comprising a mechanical feedback member connected to said plug-type valve for emulating the configuration of the plug of said plug-type valve, and at least two switch paddles, each such paddle being attached to said feedback member and positioned relative to one of said switches, respectively, for actuating said one switch when said plug is configured for a first flow status through said plug-type valve and for actuating the other of said switches when said plug is configured for a second flow status through said plug-type valve;

said solenoid operated hydraulic valves, said switches, said switch paddles and all interconnecting wiring being contained within a unitary explosion-proof container;

said switches being mounted to a unitary bracket also contained within said container;

said manifold further comprising means for receiving a source of hydraulic fluid pressure and a replaceable filter element disposed within the path of said hydraulic fluid pressure within said manifold;

two manually operable hydraulic valves, each such manually operable valve being connected in parallel with a respective one of said solenoid operated hydraulic valves whereby the flow configuration of said plug-type valve may be changed by manually enabling hydraulic pressure to said hydraulic pressure operated device;

a first flow control valve connected to said manifold in series with said source of hydraulic fluid pressure for limiting the hydraulic flow applied to said hydraulic pressure operated device;

a second flow control valve connected to said manifold in parallel with said flow control valve and in series with an additional solenoid operated hydraulic valve for selectively limiting the hydraulic flow applied to said hydraulic pressure operated device to any of at least two levels; and

an additional electrical switch connected to said additional solenoid operated hydraulic valve, and an additional switch paddle being attached to said feedback member and positioned relative to said additional switch for automatically changing the level of the hydraulic flow applied to said hydraulic pressure operated device during a change in the flow configuration of said plug-type valve.

4,687,180

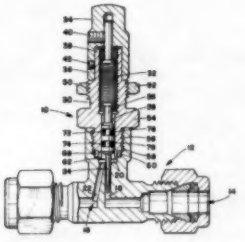
METERING VALVE

James K. Simonelli, Mentor, and Gary W. Scheffel, Streetsboro, both of Ohio, assignors to Nupro Company, Willoughby, Ohio

Continuation of Ser. No. 729,285, May 1, 1985, abandoned. This application Mar. 10, 1986, Ser. No. 838,322

Int. Cl.[4] F16K *47/00*

U.S. Cl. 251—122 **10 Claims**



1. A metering valve comprising:

a body having an inlet, an outlet, a first bore, and an orifice disposed intermediate said inlet and said outlet in coaxial communication with said first bore;

a counterbore in said body of greater dimension than said first bore;

a unitary bonnet threadedly received in said counterbore and having a passage therethrough defining a side wall;

a smooth faced cylindrical guide means integral with said bonnet so as to extend axially outward from an inner end thereof;

a stem threadedly received in said bonnet passage;

a metering pin extending coaxially outward from an inner end of said stem for selective axial movement in said orifice; and,

means received on the exterior of said stem in communica-

tion with the side wall of said bonnet passage for absorbing forces caused by contact between said metering pin and a side wall of said orifice and for allowing said stem to float in said bonnet passage, said force absorbing means including first and second O-rings at axially spaced locations on said stem with said first O-ring positioned axially outwardly of said second O-ring relative to said inner end of said stem and with said O-rings being placed in compression intermediate said stem and side wall of said bonnet passage in the absence of any fluid pressure, each said O-ring having a predetermined manufacturer compression recommendation for normal service use with said first O-ring being compressed to approximately twice the said manufacturer compression recommendation.

4,687,181

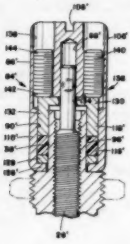
METERING VALVE

James K. Simonelli, Mentor; Gary W. Scheffel, Streetsboro, and Joseph J. Jagielo, Mentor, all of Ohio, assignors to Nupro Company, Willoughby, Ohio

Continuation-in-part of Ser. No. 729,285, May 1, 1985, abandoned. This application Feb. 14, 1986, Ser. No. 829,208

Int. Cl.[4] F16K *31/44*

U.S. Cl. 251—223 **22 Claims**



1. A metering valve comprising:

a body having inlet and outlet passageways;

an orifice interposed between said inlet and outlet passageways in said body for accommodating fluid flow therebetween;

a stem having inner and outer ends;

a metering pin extending coaxially from said stem inner end being axially shiftable in said orifice for regulating fluid flow from said inlet passageway to said outlet passageway;

a bonnet secured to said body and having said stem threadedly connected thereto, said bonnet further having an upper portion for receiving a handle;

means interposed between said stem and said bonnet for absorbing forces caused by said metering pin contacting the side wall of said orifice;

said handle received over said bonnet upper portion and non-rotatably received on said stem outer end, selective rotation of said handle causing rotation of said stem and axial shifting of said metering pin relative to said orifice; and,

means disposed along an exterior surface of said bonnet and radially confined between said bonnet and said handle for limiting lateral movement of said stem outer end relative to said bonnet upper portion, said limiting means including a polymeric packing and a packing gland disposed along an exterior surface of said bonnet upper portion.

4,687,182

HEIGHT ADJUSTABLE POT BEARING

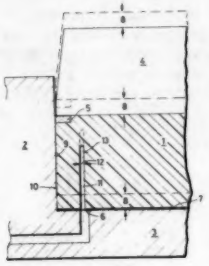
Wolfhart Andra, Stuttgart; Karl Bayer, Grosserlach; Erwin Beyer, Dusseldorf, and Hans-Peter Andra, Stuttgart, all of Fed. Rep. of Germany, assignors to SHW Schwabische Huttenwerke GmbH, Aalen-Wasseralfingen, Fed. Rep. of Germany

Filed Nov. 27, 1985, Ser. No. 802,775

Claims priority, application Fed. Rep. of Germany, Nov. 27, 1984, 3443120

Int. Cl.[4] B66F *3/24*

U.S. Cl. 254—93 R **9 Claims**



1. In a height adjustable pot bearing for the transfer, lifting and lowering of heavy structural loads, particularly bridge structures, which includes a steel pot, a steel cover plate and a seal and which forms a completely enclosed pressure chamber which is completely filled by an elastic plate formed of a rubber type substantially incompressible elastomer material, wherein for lifting a pressurized fluid is injected between the base of the pot and the elastic plate through an orifice in the pot which locally displaces the elastic plate and raises the cover plate and for lowering an amount of pressurized fluid is released, the improvement comprising a small slot formed in said elastic plate a short distance from the circumference of the inner wall of the pot and concentric therewith, said slot being open at the base of the elastic plate and extending to approximately three quarters the thickness of the elastic plate, and a ring shaped insert of wedge-shaped cross section in said slot which causes the outer radius of the elastic plate to spread and become larger than the inner radius of the pot and the elastic plate is capable of being compressed to the inner radius of the pot.

4,687,183

APPARATUS FOR THE PRODUCTION OF LIQUID IRON FROM IRON OXIDE

Jean M. van Langen, Akersloot, Netherlands, assignor to Hoogovens Groep B.V., IJmuiden, Netherlands

Division of Ser. No. 714,350, Mar. 25, 1985, Pat. No. 4,579,588, which is a continuation of Ser. No. 491,726, May 5, 1983, abandoned. This application Jan. 16, 1986, Ser. No. 819,272

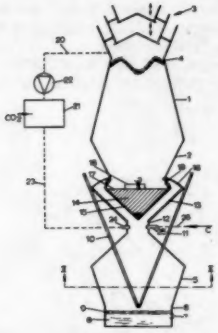
Claims priority, application Netherlands, May 12, 1982, 8201945

Int. Cl.[4] F27B *1/02*

U.S. Cl. 266—156 **11 Claims**

1. Apparatus for producing liquid iron from iron oxide, comprising at least one reduction column for the iron oxide in which the oxide is reduced by gas passed through it, a melt vessel or melting of the reduced sponge iron from the reduction column which vessel is located lower than and in open communication with the reduction column, first feed means for delivering oxygen into the melt vessel above the level of the liquid iron bath in the melt vessel during operation, second

feed means separate from said first feed means to deliver coal powder into the melt vessel above the level of the liquid iron bath during operation, and stirring means for maintaining said liquid iron bath at least partly in motion during operation.

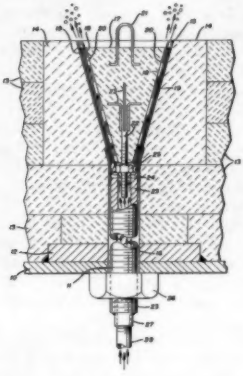


4,687,184

DEVICE FOR INTRODUCING GAS INTO MOLTEN METAL IN A WIDE ANNULAR STREAM

Michael D. Labate, Ellwood City, and Joseph A. Perri, Coraopolis, both of Pa., assignors to Insul Company, Inc., East Palestine, Ohio

Filed Jul. 14, 1986, Ser. No. 885,158
Int. Cl.[4] C21C *5/48*
U.S. Cl. 266—270 **10 Claims**



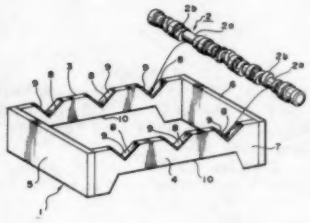
1. In a device for introducing gas into a mass of molten metal, the improvement which comprises a refractory plug and a jacket positioned thereabout in spaced relation thereto and defining an opening around said refractory plug, said refractory plug and jacket having an upper end and a lower end with said upper end being substantially larger than said lower end, a pocket block having a passageway extending vertically therethrough, said passageway being substantially larger at its upper end than at its lower end, said pocket block adapted to form a portion of a refractory lining in a container for said molten metal, said container and refractory lining having an opening therein in registry with said passageway in said pocket block, said plug and said jacket positioned in said passageway in said pocket block and means in said opening in said container and refractory lining attached to said plug and jacket and extending outwardly of said opening in said container and secured to said container, said means defining a passageway for gas introduced thereinto whereby said gas introduced into said passageway will flow upwardly between said plug and said jacket into said molten metal in said container.

4,687,185

TOOL FOR SUPPORTING A COMPOSITE CAMSHAFT DURING SINTERING

Shigeru Urano, Omiya, and Shunsuke Takeguchi, Tochigi, both of Japan, assignors to Nippon Piston Ring Co., Ltd., Japan

Filed Jun. 13, 1986, Ser. No. 873,947
Claims priority, application Japan, Jun. 14, 1985, 60-88954[U]
Int. Cl.[4] F27D *5/00, 15/00*
U.S. Cl. 266—274 **12 Claims**



1. A tool for supporting a composite camshaft during sintering, the composite camshaft having a shaft of steel and a sintered piece to be joined to the shaft through sintering, said tool, comprising:

a frame having at least two sides extending parallel and opposed to each other, said frame being constructed of graphite;

a groove means formed in an upper portion of each of said two sides for receiving one portion of said composite camshaft to be sintered; and

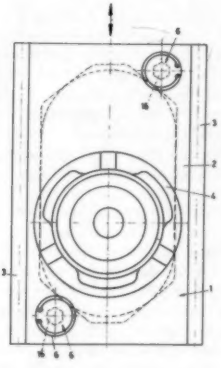
a ceramic layer provided on a surface of said groove means.

4,687,186

GRIPPING DEVICE FOR A WEARING ELEMENT

Richard Francois-Noël, Nancy, France, assignor to Vesuvius International Corporation, Wilmington, Del.

Filed Mar. 17, 1986, Ser. No. 840,266
Claims priority, application Belgium, Mar. 15, 1985, 0/214655
Int. Cl.[4] B21D *39/00*
U.S. Cl. 266—287 **13 Claims**



1. A device for gripping a wearing element of a sliding closure means for a metallurgical container and for controlling

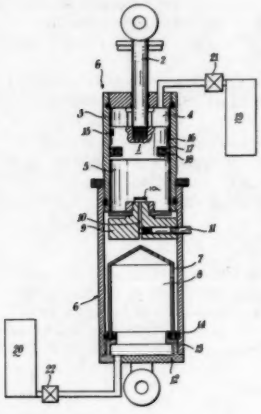
the flow rate of molten metal, composed of a refractory material surrounded by a metal reinforcement, mounted in a metal frame equipped with a base wall and with lateral abutments against which there rests at least one wearing element, the device comprising a rotatable member for setting into rotation a cam having an inclined face which pushes back a face of a wearing element while resting on a substantially parallel border of the frame facing the base thereof so as simultaneously to allow the plate, equipped with a reinforcement, to be pressed against the base of the frame, to allow the plate to be gripped against the edges and to allow the plate to be wedged in the frame.

4,687,187

OLEOPNEUMATIC SUSPENSION FOR VEHICLES, SUITABLE IN PARTICULAR FOR MOTORCYCLES

Silvano Bellapadrona, No. 15, Via dei Colli della Serpentara, 00139 Rome, Italy

Filed Jun. 24, 1985, Ser. No. 748,284
Claims priority, application Italy, Jul. 5, 1984, 48510 A/84
Int. Cl.[4] F16F 9/19
U.S. Cl. 267—64.18 **5 Claims**



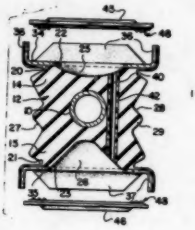
1. An oleopneumatic suspension which is generally suitable for vehicles and in particular for motorcycles, said suspension comprising a piston means, first reservoir means and second reservoir means located on opposite sides of said piston means, said first reservoir means containing air or other gaseous fluid, said second reservoir means containing oil, unidirectional valve means in said second reservoir means for the passage of oil within said second reservoir means in response to movement of said piston means toward said second reservoir means, an oil return duct means extending through the valve means for permitting oil to flow through the valve means toward the piston means in response to movement of the piston means toward the first reservoir means, means for adjusting the cross section of the oil return duct means, and third reservoir means for air or other gaseous fluid, said third reservoir means being separated from said second reservoir means by an oil tight elastic separation member; said oleopneumatic suspension having storage reservoir means and two-position valve means for regulating the pressure of said gaseous fluid, said storage reservoir means and said two position valve means being provided upstream of said first reservoir means and downstream of said third reservoir means.

4,687,188

MOUNT FOR CONTROLLING OR ISOLATING VIBRATION

Thomas A. Knurek; Terry L. Houston, both of Auburn, and Gary L. Hipsher, Logansport, all of Ind., assignors to Cooper Tire & Rubber Company, Findlay, Ohio

Filed Feb. 4, 1986, Ser. No. 825,825
Int. Cl.[4] B60G 15/04; F16F 15/04; B32B 31/06; F16M 13/00
U.S. Cl. 267—140.1 **24 Claims**



1. An isolating mount comprising
a rigid bushing,
a resilient mass surrounding said bushing,
said mass including means defining cavities on opposite sides of said bushing located along a first plane extending longitudinally through said bushing,
means defining a passage between said cavities, said passage being of substantially laser cross-section than said cavities,
a quantity of liquid filling said cavities and said passage,
a rigid outer body contacting said mass and exerting compressive force thereon only in a direction substantially along said first plane, whereby motion of said tube by displacement of said mass is restricted to a substantially greater extent along said first plane than in other directions within said body,
cover means held in sealed covering relation to said cavities whereby said liquid is confined within said cavities and said passage, and displacement of said mass in response to forces acting on the mount along said first plane will result in distention of said cavities and corresponding displacement of said liquid from one of said cavities to the other through said passage,
means for coupling said bushing to one of two members to be isolated yet connected to each other, and
means for attaching said outer body to the other of the two members.

21. A method of making an isolating mount, comprising the steps of
(a) molding a resilient block around a rigid tubular bushing member and incorporating upper and lower mounting plates bonded to the block in spaced relation to the bushing member, the plates having openings leading to separate cavities formed in the top and bottom of said block and the cavities being connected by a small passage;
(b) providing sealing cover plates sized to fit on the mounting plates and to cover the openings in the mounting plates to seal the cavities;
(c) filling the cavities and the passage with a liquid;
(d) then attaching the cover plates to the mounting plates in tightly sealed relation to enclose the liquid within the cavities and to form a central subassembly of the mount;
(e) providing a multi-part rigid outer body having an inner region dimensioned to receive the subassembly but having a lesser dimension than the outer distance between the cover plates on the subassembly;
(f) placing the subassembly within the parts of the outer body and compressing them along a plane extending longitudinally through the tubular bushing member and extending through the cavities and the covers to bring the

outer body parts into conformity with the subassembly under compression; and

(g) securing the outer body parts together.

4,687,189

SHORT STROKE ACTUATOR

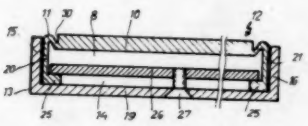
Kurt Stoll, Lenzhalde 72, 7300 Esslingen a.N, and Gerhard Hihn, Schurwaldstrasse 7, 7300 Esslingen-Berkheim, both of Fed. Rep. of Germany

Filed Jan. 21, 1986, Ser. No. 822,521

Claims priority, application Fed. Rep. of Germany, Jan. 26, 1985, 3502575

Int. Cl.⁴ B25B *11/00*

U.S. Cl. 269—22 **14 Claims**



1. A short stroke clamping actuator for exerting a clamping force on a workpiece, comprising an elongated rigid housing having a rigid bottom wall, spaced apart rigid sidewalls connected to said bottom wall and spaced apart rigid endwalls connected to said bottom wall, said housing having an elongated open front opposite from said back wall, an insert structure received in said housing, said insert structure having a movable wall extending across and closing said open front of said housing to define a pressure chamber with said housing, said pressure chamber being pressurizable to move said movable wall outwardly to engage and clamp a workpiece, said insert structure being open along an elongated opening at said rear wall of said housing, said insert structure including a clamping flange around said elongated opening thereof and engaged against said bottom wall of said housing, a retaining plate engaged over said clamping flange and over said bottom wall in said housing, and clamping means connected between said housing and said retaining plate for urging said retaining plate toward said bottom wall and against said flange for sealing said flange against said bottom wall.

4,687,190

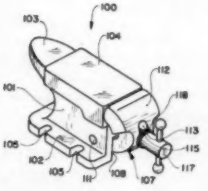
BENCH VISE

Tai-Her Yang, 5-1 Taipin St., Si-HuTown, Dzan-Hwa, Taiwan

Filed May 28, 1986, Ser. No. 867,495

Int. Cl.⁴ B25B *1/04*

U.S. Cl. 269—239 **13 Claims**



1. In a bench vise for clamping a workpiece, said bench vise being supported on the top surface of a bench, said bench vise being of the type having a fixed jaw including a clamping surface, a main body and an arcuately-shaped movable jaw, said movable jaw being arcuately movable in a direction towards the fixed jaw for clamping the workpiece therebetween, wherein the improvement comprising the main body having a slot formed therein and the movable jaw being substantially arcuately formed, the curvature thereof exceeding 180°, said movable jaw being received in said slot, pivotably secured therein to the vise at a position located above the top surface of the bench and forwardly of the clamping surface of the fixed jaw.

4,687,191

SORTER AND RECIPROCATING STAPLER APPARATUS

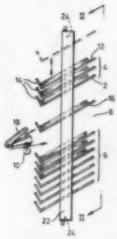
Denis J. Stemmle, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 21, 1986, Ser. No. 854,216

Claims priority, application European Pat. Off., Apr. 23, 1985, 85302824.9

Int. Cl.⁴ B42B *1/02*

U.S. Cl. 270—53 **10 Claims**



1. A nested-bin sheet sorter providing for trail-edge registration and for side-edge registration which is adjustable over a range of sheet sizes, and including means for increasing the normally-narrow spacing between adjacent bins sequentially during translation of the bins to provide an increased-space position, and for holding each bin stationary in said increased-space position for a chosen period, said sorter including a stapler which is reciprocable between a rest position in which it is clear of the bins, and an operating position in which it is able, when actuated, to staple together all the sheets in the said spaced bins, respectively, in said increased-space position.

4,687,192

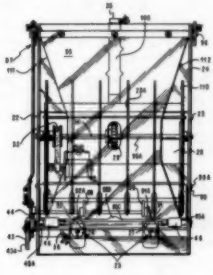
SHEET FEED APPARATUS WITH FIXED SEPARATOR PROTRUSIONS

Ronald E. Hunt, Georgetown, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 3, 1980, Ser. No. 183,702

Int. Cl.⁴ B65H *3/06*

U.S. Cl. 271—119 **9 Claims**



1. A shingler wheel for shingling sheets of paper stacked in a paper feed apparatus comprising:

a stack of paper including sheets having a predetermined coefficient of friction between adjacent sheets;

a unitarily constructed round rotatable member having a plurality of fixed round protrusions about its periphery for

engaging the outermost sheet of a stack of paper to be shingled, said round protrusions having said lower coefficient of friction with said outermost sheet than said outermost sheet has with the next adjacent sheet.

4,687,193

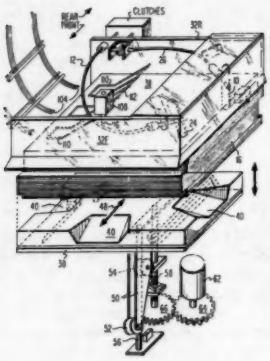
DUAL FORCE JOGGER/STACKER FOR CUT SHEET ITEMS

Mario J. Scarabino; Emmett B. Peter, and Gerald F. Rettner, all of Orlando, Fla., assignors to Unisys Corporation, Detroit, Mich.

Continuation of Ser. No. 723,381, Apr. 15, 1985, abandoned. This application Apr. 3, 1986, Ser. No. 848,335

Int. Cl.[4] B65H *29/20*

U.S. Cl. 271—184 **8 Claims**



1. High speed document stacking apparatus for offsetting or jogging individual stacks or piles of sheet items comprising:

a sheet item receiving tray,

means to move said item receiving tray vertically in opposite directions to accommodate the incoming documents as the tray fills with documents,

oppositely disposed individual independently operable, rotatable means arranged to contact and move each sheet item fed thereto, means rigidly supporting said rotatable means above said item receiving tray in confronting, offset relation in the same plane, said supporting means including individual drive means for activating said rotatable means and means for registering at least two opposite edges of each sheet item at the termination of the inflow movement of said item, each of said rotatable means being effective when selectively energized to apply orthogonal forces to each sheet item so as to move said item in two opposite directions away from said rotatable means and toward said registering means so that the said items are selectively stacked in offset piles, and control means for selectively energizing each one of said rotatable means.

4,687,194

AUTOMATICALLY-ADJUSTABLE UNEVEN PARALLEL BARS FOR GYMNASTICS

Warren T. Good, 8035 SW. 8th Ave., Portland, Oreg. 97219, and Jacob E. Vilhauer, Jr., 3325 SW. 44th, Portland, Oreg. 97221

Filed Nov. 12, 1985, Ser. No. 797,146

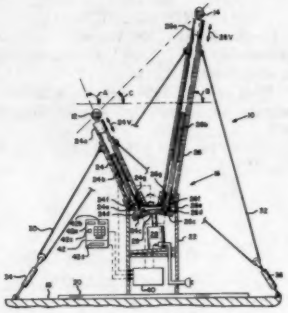
Int. Cl.[4] A63B *3/00*

U.S. Cl. 272—63 **17 Claims**

1. Uneven parallel bars for gymnastics comprising:

(a) a pair of elongate handrails;

(b) supporting means for supporting said elongate handrails in parallel relation to each other at respective positions spaced horizontally and vertically relative to each other and located at different vertical heights relative to a floor surface, said supporting means comprising a pair of elongate, telescopically extensible and retractable, supporting members extending in fixed respective upwardly diverging directions for supporting said handrails; and



(c) driving means connected to said supporting members for selectively telescopically extending and retracting said supporting members in said diverging directions and controlling the degrees of extension and retraction thereof for controllably establishing different predetermined spacings between said handrails.

4,687,195

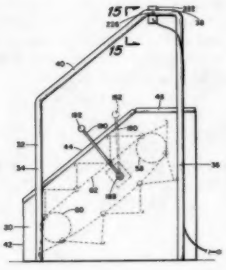
TREADMILL EXERCISER

Lanny L. Potts, Tulsa, Okla., assignor to Tri-Tech, Inc., Tulsa, Okla.

Filed Feb. 6, 1984, Ser. No. 577,171

Int. Cl.[4] A63B *23/06*

U.S. Cl. 272—69 **6 Claims**



1. A treadmill exerciser having a frame shaped in the form of a staircase, a first sprocket shaft mounted for rotation around a substantially horizontal axis and journaled in the frame in the upper portion thereof and towards the rear thereof, a second sprocket shaft mounted for rotation around a substantially horizontal axis and journaled in the frame below and forward of said first sprocket shaft, a first pair of sprockets mounted on the ends of said first sprocket shaft for keyed rotation in spaced apart and substantially vertical planes, a second pair of sprockets mounted on the ends of said second sprocket shaft for keyed rotation in spaced apart and substantially vertical planes, a pair of continuous chains mounted adjacent the sides of said frame and drivingly engaging the first set of sprockets with the second set of sprockets, each chain being provided with a plurality equidistantly spaced apart hinge links, each hinge link being adapted to receive therethrough one end of a hinge shaft, the hinge links on each chain being in horizontal aligment with the hinge links on the other chain, a plurality of steps mounted

on the chains and adapted to move therewith, each step having a normally vertical riser portion and a normally horizontal tread portion, the upper end of the riser portion of each step being connected to the forward end of the tread portion of said step by means of a first hinge, the lower end of each riser portion being connected to the rear of the tread portion of an adjacent step by means of a second hinge, a hinge shaft passing through each pair of aligned hinge links in said chains and through said second hinge, whereby when a person places his weight on a tread portion of a step adjacent the lower end of the frame, the steps will move in a downward direction along the upper course of the chains and in an upper direction along the lower course of the chains, and whereby when the person exerts his weight on the tread portion on successively higher steps, the steps will continue to move in a downward direction along the upper course of the chain and in an upper direction along the lower course of the chain such that the steps, as they traverse around the upper and lower sprockets, will fold at an acute angle around the first and second hinges.

4,687,196

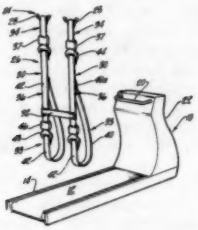
TREADMILL ASSEMBLY

Max M. Dubrinsky, 6324 Rose Blvd., West Bloomfield, Mich. 48033, and Mary S. Edwards, 6478 Rustic Ridge Trail, Grand Blanc, Mich. 48439

Continuation of Ser. No. 761,796, Aug. 2, 1985, Pat. No. 4,655,447. This application Dec. 11, 1986, Ser. No. 940,370

Int. Cl.[4] A63B *23/06*

U.S. Cl. 272—69 **2 Claims**



1. A method for preventing injury to the user of a treadmill without interfering with the natural running movement of user on the treadmill, said method comprising the steps of:

(1) harnessing the user within a harness, said harness having a pair of spaced straps supported from an overhead support means, each strap including a loop portion at its lower end adapted to pass between the legs of the user and a catch band extending transversely between the straps adjacent the central region of the user's back;

(2) adjusting said harness such that said loops hang loosely between said user's legs so that said loops do not supportingly engage said user, thereby permitting unhindered running movement of the user;

whereby, said harness does not support said user during operation of said treadmill but will function in response to collapse of the user to catch the user in a seated position and prevent the user from falling off the treadmill.

4,687,197

EXERCISE APPARATUS WITH DUAL PIVOTAL MOTION AND CYLINDER RESISTANCE ASSEMBLY

Lars Larsson, P.O. Box 7266, Laguna Niguel, Calif. 92677, and Bengt Svesson, Bromåla, 37193 Karlskrona, Sweden

Filed May 2, 1983, Ser. No. 490,840

Int. Cl.[4] A63B *69/06*

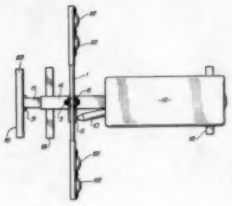
U.S. Cl. 272—72 **12 Claims**

1. An exercise apparatus comprising:

a frame section including seat means for supporting an exerciser in a position in which the exerciser is aligned with a vertical central plane of the frame section so that the right side of the exerciser is to one side of the central plane and the left side of the exerciser is to the other side of the central plane;

a rod;

means on the frame section for supporting the rod for rotation with respect to the longitudinal axis of the rod and for otherwise maintaining the rod stationary, said rod having a free end located in the central plane;



a single elongated handle pivotally secured at the midpoint thereof to the free ends, both of which are contacted by the exerciser, and wherein said handle is pivotal about an axis which is perpendicular to the longitudinal axis of the rod and perpendicular to the longitudinal axis of the handle; and

resistance means including at least one resistance cylinder means for providing resistance to the movement of the handle.

4,687,198

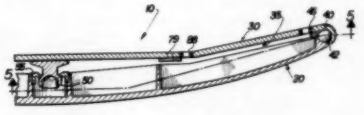
RECREATIONAL PLATFORM

Terry W. Smith, 3618 NE. 167 St., N. Miami Beach, Fla. 33160

Filed Jan. 6, 1986, Ser. No. 816,433

Int. Cl.[4] A63B *23/04*

U.S. Cl. 272—114 **9 Claims**

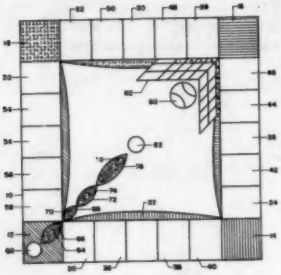


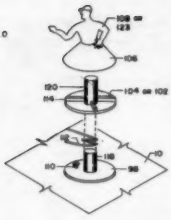
1. A recreational device to be used on a bearing surface comprising a circular contact plate member having a convex lower surface shaped to the periphery of the contact member as a portion of a sphere such that the lower surface of the plate member at all times forms a single point of contact with a bearing surface on which the contact plate member rests, a platform member supportably mounted on the upper surface of the contact plate member for rotation about the central axis of the circular plate member, said platform member having an outer circular periphery of a diameter substantially the same as that of the circular contact plate member, and the upper surface of the recreational device being substantially smooth and upwardly unobstructed from the center of the device throughout the full radial extent of the platform member for placement and support of the feet of a user thereon throughout its full radial extent.

4,687,199
BASE BALL GAME

Enrique Aguirregomezcorta, 7555 SW. 29 St., Miami, Fla. 33155

Filed Nov. 29, 1985, Ser. No. 803,015
Int. Cl.[4] A63F 3/00, 7/06, 9/04
U.S. Cl. 273—93 R 3 Claims



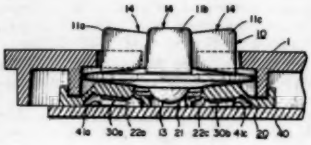


1. A baseball game apparatus comprising,
(a) a game board,
(b) a representation of a baseball diamond on said game board comprising four base spaces each of a different color and a group of intermediate spaces between each of said base spaces, means marking each of said groups of spaces being marked with the same color as one of bases, each color of a base being represented,
(c) a space to represent the pitcher's location on said game board,
(d) eleven marked spaces on said board, in four groups for designating possible pitching plays,
(e) eleven markers each bearing a different identifying indicia for placement on said eleven marked spaces,
(f) a pitching device comprising means for randomly selecting one of said eleven indicia,
(g) a first distinguishable group of cards for individual placement on selected ones of said intermediate spaces and having on one side thereof indicia designating a plurality of plays of the game,
(h) a second distinguishable group of cards for individual placement on selected others of said intermediate spaces and having indicia designating a plurality of groups of plays of the game and,
(i) a batting device having means for randomly selecting one of said four colors for selecting a group of intermediatespaces and for selecting a particular one of said spaces, and for selecting a particular one of said play indicia on the card on that space.

4,687,200
MULTI-DIRECTIONAL SWITCH

Ichiro Shirai, Kyoto, Japan, assignor to Nintendo Co., Ltd., Kyoto, Japan

Continuation of Ser. No. 521,116, Aug. 5, 1983, abandoned. This application Aug. 9, 1985, Ser. No. 764,514
Int. Cl.[4] H01H 25/00
U.S. Cl. 273—148 B 11 Claims



1. A multi-directional switch which can be manually actuated in multiple directions by a depressing action with the tip of a finger of an operator, said multi-directional switch comprising:
(a) a base member;
(b) an integral key member disposed above said base member, said key member including a plate portion and a manipulation portion extending upwardly from said plate portion, said manipulation portion having a downwardly concave upper surface for receiving a fingertip of the operator, said plate portion having a generally planar bottom surface that is sloped upwardly relative to said base member in the direction extending radially outwardly from a central portion of said bottom surface;
(c) a plurality of electrodes disposed on said base member, said electrodes having generally planar contact surfaces;
(d) a deformable sustaining member composed of flexible, resilient material, said sustaining member:
(i) underlying the bottom surface of and upwardly supporting said key member and,
(ii) overlying and nominally spaced above said base member;
(e) a plurality of electrically conductive members having generally planar contact surfaces, said electrically conductive members mounted on said sustaining member and carried by said sustaining member at locations above a corresponding electrode;
(f) a support member extending downwardly from a central portion of the lower surface of said key member, said support member integrally formed with said key member and constituting a fulcrum between said key member and said base member; and,
(g) whereupon when said key member is depressed and tilted downwardly about said support member by use of a fingertip of the operator, the substantially planar bottom surface of said key member presents a generally planar bearing area against the adjacent region of said underlying sustaining member, thereby to temporarily deform said underlying sustaining member and simultaneously push a corresponding conductive member, being carried by said sustaining member, downwardly into face-to-face contact with its corresponding electrode.

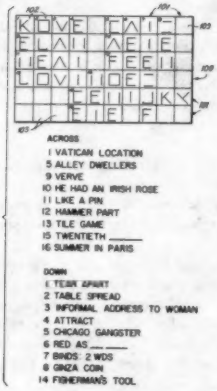
4,687,201
SYMBOL PUZZLE

Paul Riviera, 1310 Pennsylvania Ave., Brooklyn, N.Y. 11239

Filed Jun. 6, 1986, Ser. No. 871,345
Int. Cl.[4] A63F 9/06
U.S. Cl. 273—153 R 25 Claims

1. A puzzle, comprising:
a plurality of symbols each of which is representative of at least two characters, some of the symbols adapted to be selectively converted to any one of the at least two corresponding characters and some of the symbols being adapted to either be selectively converted to at least one

of the at least two corresponding characters or being adapted to not be converted and thereby representing the remaining one of the at least two corresponding characters;



a matrix of defined spaces, each of said spaces containing a symbol;

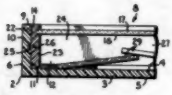
whereby the puzzle is solved by selectively converting some of said symbols to the appropriate corresponding character and by selectively not converting some of the symbols.

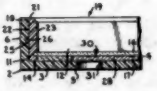
4,687,202

COMBINATION PUZZLE, BOX AND HANGABLE PUZZLE FRAME

Beverly Palma, 6942 NW. Prairie View Rd.,-Kansas City, Mo. 64151

Filed May 30, 1986, Ser. No. 869,096
Int. Cl.[4] A63F *9/10*
U.S. Cl. 273—157 R **3 Claims**





1. In combination, a puzzle and box therefore.

(a) said puzzle comprising multiple interlocking pieces;

(b) said box including a bottom portion comprising a bottom wall and a sidewall defining an upwardly opening recess;

(c) said box further including a top portion comprising a transparent top wall and sidewall defining a downwardly opening recess;

(d) said bottom portion sidewall and said top portion sidewall including interengaging members adapted for interfitting engagement to form a storage enclosure wherein said bottom wall and said top wall are in spaced apart relation with said puzzle pieces therebetween;

(e) said interengaging members adapted to secure said top and bottom walls in close proximity to each other when said top portion is inverted and inserted into said upwardly opening recess,

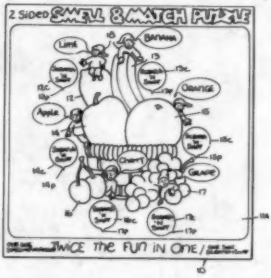
(f) whereby said top and bottom walls are adapted to engage and secure said puzzle therebetween after puzzle completion and display the completed puzzle through said transparent top wall.

4,687,203

SCRATCH AND SMELL GAME

Donald Spector, 380 Mountain Rd., Union City, N.J. 07087

Filed May 15, 1986, Ser. No. 863,561
Int. Cl.[4] A63F *9/10*
U.S. Cl. 273—157 R **9 Claims**



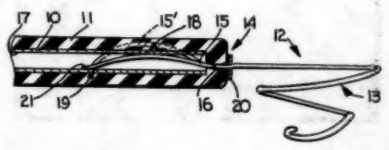
1. A scratch and smell game comprising a playing board having front and rear faces, said front face having printed thereon at distinct positions representations of different natural objects each having a characteristic smell which differs from the smell of the other object, said board being provided with removable playing chips all having the same geometry seated in cutouts in the board at sites adjacent the respective natural objects, the front face of each chip being coated with a layer of rupturable minute capsules containing a substance which when the layer is scratched to rupture the capsules exudes an odor that simulates that of the adjacent object, the rear face of the board having printed thereon representations of different objects, a portion of each representation appearing on the rear face of a respective chip, whereby when in playing the game the chips are removed from their cutouts, scratched and smelled, and each chip is then returned to that site which the player believes is adjacent a natural object whose characteristic smell is simulated by the chip, the player wins the game only if upon examining the rear face he then finds that all object representations thereon have been completed by the portions thereof on the chips.

4,687,204

GOLF CLUB INCLUDING DETACHABLE GOLF BALL RETRIEVER

Paul S. Lempio, 11 Fay Dr., Kentfield, Calif. 94904

Filed Sep. 17, 1985, Ser. No. 777,079
Int. Cl.[4] A63B *53/00;* **A47F** *13/06*
U.S. Cl. 273—162 E **9 Claims**



1. A golf club including a golf ball retriever attached to said golf club through a hole formed axially through the butt end of a grip secured on an end of a hollow shaft thereof, said hole

being smaller in diameter than the internal diameter of said shaft, said retriever comprising

scoop means for retrieving and retaining at least one golf ball therein, and

attachment means insertable through said hole for releasably attaching said scoop means to said golf club by insertion through said hole and frictional engagement with said hollow shaft.

4,687,205

IRON TYPE GOLF CLUB HEAD

Ichiro Tominaga, and Teruo Sasaki, both of Kobe, Japan, assignors to Simitomo Rubber Industries, Ltd., Japan

Filed Aug. 9, 1984, Ser. No. 639,186
Claims priority, application Japan, Aug. 20, 1983, 58-151966
Int. Cl.[4] A63B *53/04*
U.S. Cl. 273—169 **23 Claims**

1. A golf club comprising an iron type golf club head formed of a composite material comprising light metal containing silicon carbide whiskers and occupying 20% or more by volume of said club head.

4,687,206

GLOBAL DOMINATION BOARD GAME

Christopher D. Cordry, and Stephen T. Weeks, both of Oklahoma City, Okla., assignors to New Earth Games, Oklahoma City, Okla.

Filed Dec. 24, 1984, Ser. No. 686,307
Int. Cl.[4] A63F *3/00*
U.S. Cl. 273—262 **20 Claims**

8. A game apparatus comprising:

a plurality of movable playing pieces; and

a game board comprising:

a central map portion depicting a planetary surface comprising a plurality of land masses thereon, each of said land masses being divided into a plurality of territories, and whereon players of said game may place and move said playing pieces;

land mass indicia for identifying and distinguishing said land masses;

territorial indicia for identifying and distinguishing said territories; border indicia for indicating adjacent territories and paths of attack between said territories, said border indicia including: common borders between said territories: constructive borders between spaced territories; and constructive borders between continental land masses;

territorial asset indicia for indicating one of a plurality of assets as a primary asset for each of said territories, whereby combinations of said assets determine a quantity and relative strength of at least some of said playing pieces;

a border surrounding said central map portion, said border comprising play action indicia for indicating proper play action followed by players playing said game; and

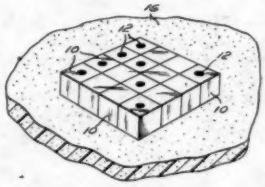
damage indicia for indicating a non-survival condition in which all players lose and a plurality of survival conditions dependent upon results of said simulated military attacks.

4,687,207

METHOD OF MANIPULATING PLAYING PIECES

Phillip H. Darling, 8027 Maple Dr., Buena Park, Calif. 90620

Filed Apr. 16, 1986, Ser. No. 852,783
Int. Cl.[4] A63F *3/00, 9/08*
U.S. Cl. 273—271 **10 Claims**



1. A method of manipulating sixteen playing pieces closely arranged in a 4×4 square having four rows and four columns, each of said pieces having a first surface with indicia on said surface, comprising the steps of:

manipulating said playing pieces individually to display said indicia, or interchanging entire rows or columns of four of said pieces in one of the following manners:

interchanging two outside rows:

interchanging two outside columns;

interchanging two inside rows;

interchanging two inside columns;

interchanging the outside rows with the immediately adjacent rows; or

interchanging the outside columns with the immediately adjacent columns; and

scoring a point for an arrangement of indicia corresponding to one of the following patterns:

four indicia in one of the four rows;

four indicia in one of the four columns;

four indicia in one of the two diagonals;

four indicia in the upper left quadrant of said square;

four indicia in the upper right quadrant of said square;

four indicia in the lower right quadrant of said square; or

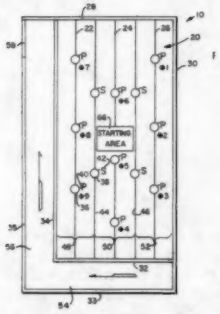
four indicia in the interior pieces of said square.

4,687,208

COURT BALL GAME

Squire J. Thomas, 2200 Wheatley Dr., Apt. 101, Baltimore, Md. 21207

Filed Dec. 22, 1986, Ser. No. 944,819
Int. Cl.[4] A63B 71/02; A63C 19/00
U.S. Cl. 273—411 4 Claims



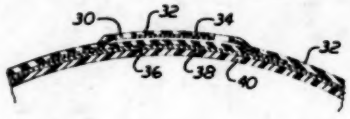
1. A system for playing a game of skill on a defined court by player projection of a first object against a second object distal therefrom to cause caroming of the projected object from the second object onto a third object distal from the second object to score points, characterized by: the first object being a ball, a plurality of said second, third and fourth objects, each second object having a shape for selectively deflecting a ball laterally downwardly and upwardly, each third object being a cylindrical pin having means for holding it upright, and each fourth object comprising means for increasing probability of causing said caroming onto the pin, by being thrown against a second object and shifting the second object closer to the pin, each said means for shifting being in the form of a bat.

4,687,209

SOCCER TRAINING BALL ASSEMBLY

Robert G. Carey, 2323 N. Merrily Cir., Seffner, Fla. 33584

Filed Oct. 3, 1986, Ser. No. 914,916
Int. Cl.[4] A63B 43/00, 69/26
U.S. Cl. 273—411 5 Claims



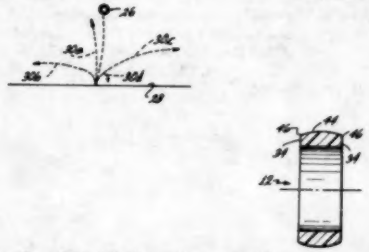
1. A soccer ball assembly for practice purposes comprising:
(a) a captive soccer ball;
(b) a tether attached at a first end through a mounting channel in the soccer ball and at a second end to the waist of a player;
(c) the mounting channel having an opening at each end in the surface of the soccer ball, the channel projecting downwardly into the soccer ball through a first elastomeric layer and a canvas layer located as a patch below the first elastomeric layer of the ball, the canvas being of sufficient diameter to enclose the outer dimension of the channel, the canvas layer passing through holes in a second elastomeric layer interior to the first elastomeric layer and the canvas layer attaching by vulcanization to a synthetic fabric layer surrounding an interior bladder of the ball.

4,687,210

TOY BOUNCING RING

James C. Michel, 1552 Faith Ct., Simi, Calif. 93063

Filed Sep. 20, 1985, Ser. No. 778,553
Int. Cl.[4] A63B 65/00
U.S. Cl. 273—425 7 Claims



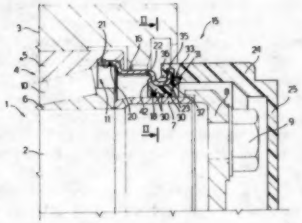
1. A toy ring adapted for bouncing comprising:
a body with an axis of symmetry, said body characterized by an exterior surface; and
means for producing unpredictability of rebound flight defined on said exterior surface;
wherein said means for producing unpredictability of rebound flight comprises a reflective metallized layer on at least one surface of said ring.

4,687,211

SEALING ASSEMBLY PARTICULARLY FOR RAILWAY AXLE BEARINGS

Mario Bessone, Pinerolo, Italy, assignor to RIV-SKF Officine Di Villar Perosa S.p.A., Italy

Filed Dec. 2, 1986, Ser. No. 937,116
Claims priority, application Italy, Dec. 10, 1985, 54192/85[U]
Int. Cl.[4] F16J 15/16, 15/447
U.S. Cl. 277—50 6 Claims



1. A sealing assembly which can be interposed between two relatively rotatable members substantially to seal an annular cavity defined between the said members in a fluid-tight manner, particularly for railway axle bearings, of the type comprising a rigid baffle which can be fitted securely to the radially outermost member and a sealing element rigidly carried by and projecting from the said rigid baffle and able to cooperate with the radially inner member or with an element to which the said radially inner member is connected, characterised by the fact that the said rigid baffle includes a fixing portion which can be fixed rigidly to the said radially outer member, and a sleeve portion coaxial with the said fixing portion and projecting with respect thereto, the said sleeve portion being firmly fixed at its free end to the said sealing element and to a cup-shape cover fixed in a removable manner to an edge of the said free end, the said cover substantially closing the free end of the said sleeve portion of the baffle in a fluid-tight manner and, with it, the said annular cavity, and the said sealing element being provided with a plurality of radial non-sliding ribs which can

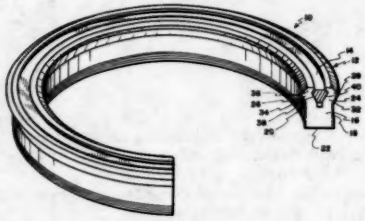
cooperate with the radially inner member and with the said element fixed to it to define a labyrinth seal.

4,687,212

SEAL ASSEMBLY WITH STABILIZING RIBS

Alma A. Timpson, Jr., Sandy, and Richard N. Rachal, Kearns, both of Utah, assignors to Baraw Corporation, Murray, Utah

Filed Dec. 16, 1986, Ser. No. 942,177
Int. Cl.[4] F16J *15/32*
U.S. Cl. 277—205 **10 Claims**



1. An annular sealing ring with a generally Y-shaped cross-section for sealing between a piston and a curved wall of a cylinder comprising a base, a pair of sealing lips for contact with said piston and said curved wall, and a solid, elastic expander ring;

said base having a generally rectilinear crosssection defined by a horizontal bottom surface, a pair of spaced vertical side surfaces extending upwardly from opposite ends of said horizontal bottom surface, and at least one horizontal rib projecting outwardly along each vertical side surface;

said pair of sealing lips spaced apart and extending from said base, each lip having a slanted side surface projecting upwardly and outwardly from one of said vertical side surfaces, a horizontal top surface extending inwardly from the top end of said slanted side surface whereby a sealing edge is formed by the intersection of said slanted side surface and said horizontal top surface;

said pair of lips also having corresponding, similarly opposed, inner surfaces including a first pair of slanted inner surfaces converging and extending downwardly from said horizontal top surfaces, a second pair of slanted inner surfaces diverging and extending downwardly from said first pair of slanted inner surfaces, a third pair of slanted inner surfaces converging and extending downwardly from said second pair of slanted inner surfaces, and a pair of vertical inner surfaces extending downwardly from said third pair of slanted inner surfaces and connecting to opposite ends of a horizontal inner surface, said inner surfaces forming the boundary of a cavity; and

said solid, elastic expander ring being retained in said cavity by said second and said third pair of slanted inner surfaces, said ring having a generally truncated diamond-shaped cross-section, the top of said ring being more truncated than the bottom of said ring.

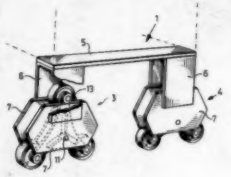
4,687,213

WHEEL ASSEMBLY FOR TRAVERSING OBSTACLES

Carl J. Ridderstolpe, Tvetabergs gård, S-151 90 Södertälje, Sweden

PCT No. PCT/SE85/00220, § 371 Date Apr. 28, 1986, § 102(e) Date Apr. 28, 1986, PCT Pub. No. WO86/02052, PCT Pub. Date Apr. 10, 1986
PCT Filed Sep. 24, 1985, Ser. No. 859,986
Claims priority, application Sweden, Sep. 25, 1984, 8404792
Int. Cl.[4] B62B *5/02*; B62D *61/00*
U.S. Cl. 280—5.26 **10 Claims**

1. A wheel assembly, comprising at least three wheel members (9) which are rotatable along a contact surface (2) and equally spaced on a carrier member (8) which is movably connected with a frame (7; 14), e.g. a portion of a wagon body, a vehicle chassis, a container or a conveyor, the frame (7; 14) being displaced relative to the contact surface, characterized in that the carrier member (8) is continuously movable in a plane substantially perpendicular to the contact surface, a plurality of circular support means (13) concentric with the wheel members (19) and individually associated therewith, said support



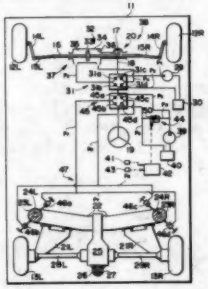
means engaging support surfaces on the frame such that the distance between the frame and the contact surface (2) is maintained substantially constant independent of irregularities (12) projecting from the contact surface and having a maximum length equal to the distance between any two (9*a*, 9*c*) of the wheel members simultaneously in contact with the contact surface (2).

4,687,214

FOUR WHEEL STEER SYSTEM WITH FAIL-SAFE CONTROL

Takaaki Uno, Kawasaki, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed Aug. 5, 1986, Ser. No. 893,287
Claims priority, application Japan, Aug. 6, 1985, 60-173772
Int. Cl.[4] B62D *5/00*
U.S. Cl. 280—91 **10 Claims**



1. A steer system for a vehicle, comprising:

a front wheel steering system for steering front wheels of said vehicle,

a rear wheel steering system for steering rear wheels of said vehicle,

means for sensing a vehicle speed of said vehicle,

control means for controlling rear wheel steer angle and direction of said vehicle in accordance with said vehicle speed sensed by said vehicle speed sensing means, normally in a normal mode by sending a control signal to said rear wheel steering system, and

means for detecting a failure in said rear wheel steering system, said vehicle speed sensing means and said control means, and producing a failure detection signal when a failure is detected, said failure detecting means being connected with said control means, said control means steering said rear wheels by commanding said rear wheel steering system in a fail-safe mode in which said rear

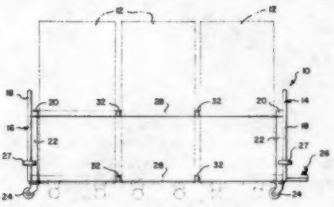
wheels are steered always in the same direction as said front wheels are steered, when said failure signal is present.

4,687,215

APPARATUS FOR TRANSPORTING WHEELED CARRIERS

Thomas Brendgord, Erie, Pa., and George E. Otte, Calabash, N.C., assignors to American Sterilizer Company, Erie, Pa.

Filed Aug. 16, 1985, Ser. No. 766,749
Int. Cl.[4] B62B *3/10*
U.S. Cl. 280—79.1 R **3 Claims**



1. Apparatus for transporting articles, comprising:
a. a plurality of wheeled carriers for containing said articles;
b. means for transporting said plurality of wheeled carriers, comprising:
(i) a first vertical end frame having wheels attached to the lower portion thereof;
(ii) a second vertical end frame having wheels attached to the lower portion thereof, said second end frame being disposed parallel to and in spaced facing relation to said first end frame;
(iii) an upper spine element extending between and affixed to the upper portions of said first and second end frames;
(iv) a lower spine element extending between and affixed to the lower portions of said first and second end frames;
(v) a plurality of horizontal arms extending from the lateral sides of said upper and said lower spine elements in vertically aligned relation so as to define a plurality of open-bottomed cells, each cell being of the horizontal cross-sectional shape of one of said wheeled carriers so as to allow a wheeled carrier to be horizontally inserted into said cell and roll on its wheels during transport;
c. means for releasably securing said carriers within said cells.

4,687,216

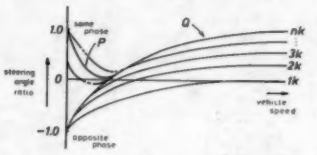
FRONT AND REAR WHEEL STEERING DEVICE FOR VEHICLE

Yoshimich Kawamoto; Yoshimi Furukawa; Tetsuro Hamada, and Mitsuya Serizawa, all of Tochigi, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 27, 1986, Ser. No. 844,803
Claims priority, application Japan, Mar. 27, 1985, 60-62359; Mar. 27, 1985, 60-62360
Int. Cl.[4] B62D *6/02*
U.S. Cl. 280—91 **5 Claims**

1. A front and rear wheel steering device for vehicle for variably controlling the steering angle ratio of rear wheels relative to the steering angle of front wheels according to a certain mathematical function of vehicle speed in such a manner that the rear wheels are steered in opposite phase relationship in a low speed range and in same phase relationship in a high speed range, comprising:

a selection means for manually selecting a special mathematical function for an extremely low speed range which will cause a same phase relationship at an extremely low speed



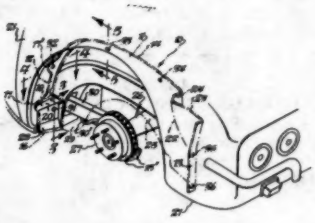
and a smooth transition to the certain mathematical function.

4,687,217

SHIELD FOR AUTOMOTIVE VEHICLE

Derrel N. Stewart, 6041 Thornwood Dr., Hamburg, N.Y. 14075

Filed Jan. 22, 1985, Ser. No. 693,384
Int. Cl.[4] B62D *25/16*
U.S. Cl. 280—153 R **20 Claims**



11. A shield for mounting in the wheel well of an automobile comprising a substantially planar main body portion having inner and outer sides, an upper edge portion on said main body portion, a forward edge portion extending outwardly from and substantially perpendicularly to said inner side, first fastener receiving hole means in said forward edge portion, a rear edge portion extending outwardly from and substantially perpendicularly to said inner side, second fastener receiving hole means in said rear edge portion, third fastener receiving hole means in said upper edge portion, a front portion located below said forward edge portion and extending substantially perpendicularly to said inner side and extending outwardly from said inner side a greater distance than said forward edge portion, and a lower edge of concave configuration on said main body portion.

4,687,218

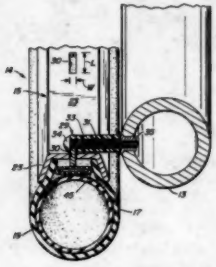
WHEELCHAIR HANDRIM ASSEMBLY

James Okamoto, Clovis, Calif., assignor to Motion Designs, Inc., Fresno, Calif.

Filed Jun. 23, 1986, Ser. No. 877,494
Int. Cl.[4] B62M *1/14*
U.S. Cl. 280—242 WC **13 Claims**

1. An improved handrim assembly for a wheelchair comprising:
(a) a rigid circular handrim;
(b) a wheel assembly including a rigid circular wheelrim having a circular rim wall and a plurality of circumferentially spaced-apart slots formed through said rim wall, said slots being elongated in the circumferential direction;
(c) a plurality of anchor tab members fitted loosely through each of said slots, each of the anchor tab members having a head portion having a dimension exceeding one of the dimensions of an associated slot and neck portion dimensioned for loose insertion from an outer side of said rim

wall through the slot to extend radially inward beyond the inner periphery of the wheelrim, said neck portion having a flat side mounted to bear against the elongated side of said slot;



(d) a plurality of spacer means extending laterally of said rim wall and connecting each of the inwardly extending neck portions of the anchor tab members to the handrim to rigidly attach said hand rim to the wheelrim at a distance spaced laterally therefrom.

4,687,219

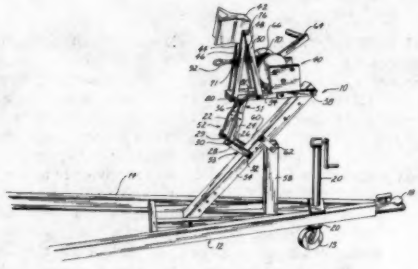
PIVOTABLE TRAILER EXTENSION

Joseph J. Rendzio, P.O. Box 15776, Tampa, Fla. 33684

Filed Mar. 24, 1986, Ser. No. 843,041

Int. Cl.[4] B62D *3/10*

U.S. Cl. 280—414.1 **5 Claims**



1. A pivotable trailer extension for connection to a trailer hauling a boat or other watercraft, comprising in combination:

a platform;

a winch assembly;

a chock assembly;

means for fixedly connecting said winch assembly and said chock assembly to said platform, said means comprising means for pivotably connecting said platform to an upstanding support member affixed to the front portion of the trailer and positioning said chock assembly above said winch assembly such that a cable of said winch assembly passes underneath said chock assembly for connection to the bow of the boat and such that said chock assembly remains stationary relative to said winch assembly; and

means for connecting said platform to a front portion of the trailer in alignment with a bow of the boat, whereby said platform, said winch assembly and said chock assembly may simultaneously pivot upwardly together as the boat is chocked up to said chock assembly by said winch assembly and the boat and trailer are removed from a body of water having a boat ramp onto a level surface.

4,687,220

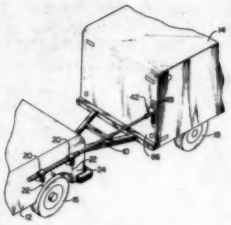
TRAILER HITCH COUPLING DEVICE

Oscar Danielson, 900 Tascosa St., Trinidad, Colo. 81082

Filed Nov. 5, 1985, Ser. No. 795,087

Int. Cl.[4] B60Q *1/00*

U.S. Cl. 280—477 **18 Claims**



1. Apparatus adapted to assist a driver of a tractor vehicle which normally moves in a direction of travel corresponding to the tractor vehicle's longitudinal axis when maneuvering the tractor vehicle into position with respect to a trailer vehicle in order to couple respective mateable hitch elements on the tractor and trailer vehicle by visually signalling that the hitch elements are aligned with one another, comprising:

first and second elongated members connected to each other in freely telescoping relation along a common axis, said first elongated member connectable to the tractor vehicle and said second elongated member extendable away from the tractor vehicle when the first elongated member is secured to the tractor vehicle and having a free end opposite said first elongated member;

connecting means for connecting said first elongated member to the tractor vehicle in a generally horizontal orientation generally parallel to the longitudinal axis of the tractor vehicle whereby said free end may be advanced in a direction of movement of the tractor vehicle; and

a signal element having a head portion and a tail portion and being pivotally mounted on said free end about a pivot axis such that the head portion and the tail portion are in a passive state when the elongated members are in the horizontal orientation, said tail portion extending outwardly from said free end in a direction opposite said first elongated member and at a small acute angle to the longitudinal axis, said tail portion to be advanced with movement of the tractor vehicle toward contact with a target surface and operative upon contact with the target surface to pivot said signal element into an active state; said head portion including a visual indicator means for visually signalling the occurrence of the active state, said indicator means being out of the driver's view when said signal element is in the passive state yet moving into the driver's view when the signal element is pivoted into the active state.

4,687,221

PIVOTABLE SKI BINDING ASSEMBLY COMPRISING A BRAKING SYSTEM

Georges P. J. Salomon, Annecy, France, assignor to Salomon S.A., Annecy, France

Continuation of Ser. No. 53,774, Jul. 2, 1979, abandoned. This application Jun. 28, 1985, Ser. No. 749,718

Claims priority, application France, Jul. 2, 1978, 78 19920

Int. Cl.[4] A63C *7/10*

U.S. Cl. 280—605 **9 Claims**

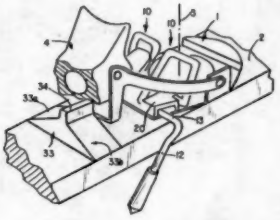
1. A device adapted to be mounted on a ski, said device comprising:

(a) a first maintenance element;

(b) a pivotable plate, adapted to pivot around an axis substantially perpendicular to said ski while remaining se-

cured to said ski, and comprising a second maintenance element; wherein said first maintenance element and said pivotable plate are each adapted to be mounted on a ski such that said first and second maintenance elements may serve to securely maintain the ends of a ski-boot mounted on said ski while laterally releasing said boot when said boot is subjected to a torsional force relative to said ski; and

(c) a braking assembly adapted to pivot together with said pivotable plate, said assembly comprising:



(i) braking means adapted to shift between active and inactive positions, said braking means being normally biased to the active position in which said braking means is adapted to brake said ski;

(ii) at least one boot-sensitive element adapted to shift the braking means to the inactive position as said boot is mounted on said ski; and

(iii) a ramp mounted on said ski and adapted to engage a portion of said braking means when said braking means is in the active position.

4,687,222

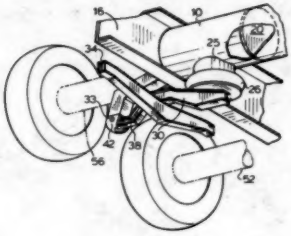
TANDEM AXLE AIR SUSPENSION

Wallace G. Chalmers, 10 Avoca Ave., Suite 1504, Toronto, Ontario, Canada (M4T 2B7)

Filed Apr. 28, 1986, Ser. No. 856,311

Int. Cl.[4] B60G *5/00*

U.S. Cl. 280—678 **13 Claims**



1. A suspension system for a vehicle having a frame and a pair of tandem axles disposed beneath said frame transversely thereof comprising, in combination:

means interconnecting said axles and said frame for locating said axles relative to the frame and for permitting said axles to articulate relative to each other and to said frame;

a walking beam disposed beneath said frame on each side thereof parallel to the longitudinal axis of the frame, each said walking beam resting at each end on an axle;

an outrigger bracket extending outwardly from each side of the frame in substantial alignment with each other opposite the mid-point of a walking beam;

a transverse lever pivotally seated between its ends on each of said walking beams in alignment with one of said outrigger brackets, and means for connecting the outer end or said transverse lever to the said outrigger bracket;

a pair of air springs positioned under said frame in side-by-side relation in alignment with said transverse levers; and

means for connecting the inner ends of said transverse levers to the underside of said air springs.

4,687,223

SUSPENSION SYSTEM FOR VEHICLE

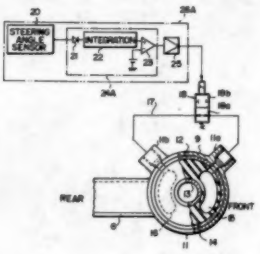
Akihiko Miyoshi, and Hitoshi Nakashima, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Apr. 8, 1985, Ser. No. 720,806

Claims priority, application Japan, Apr. 11, 1984, 59-73749; Apr. 11, 1984, 59-73750

Int. Cl.[4] B60G *17/08*

U.S. Cl. 280—707 **19 Claims**



1. A suspension system for a vehicle comprising a suspension arm connected to the vehicle body by way of a bushing, an adjustment means for changing the resistance of the bushing against a movement in the longitudinal direction of the vehicle body, a steering angle sensor for detecting the turning angle of the steering wheel of the vehicle, a vehicle speed sensor for detecting the speed of the vehicle, and control means for controlling the adjustment means to increase the hardness of the bushing against a movement in the longitudinal direction of the vehicle body as at least one of the steering angle and the vehicle speed is increased.

4,687,224

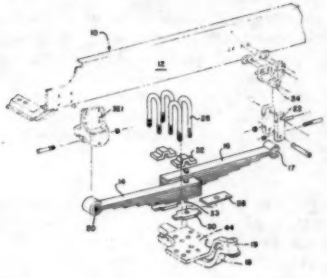
DUAL OFFSET CANTILEVERED SPRING SUSPENSION

Robert J. Selzer, Fort Wayne, Ind., assignor to Navistar International Corporation, Chicago, Ill.

Filed Jun. 14, 1985, Ser. No. 745,396

Int. Cl.[4] B60G *11/04, 19/02*

U.S. Cl. 280—718 **6 Claims**



1. A truck frame suspension system comprising:

an axle positioned transversely to said frame, said axle hav-

ing a pair of mounting plates disposed adjacently transversely near an end thereof;

a first leaf spring having a first end mounted as a cantilever to one of said pair of mounting plates and extending in a first direction to a distal end attached to the truck frame; and

a second leaf spring having one end mounted as a cantilever to the other of said pair of mounting plates and extending in a second direction opposite of the first direction to an opposite end attached to the truck frame, said second leaf spring longitudinally overlapping said first leaf spring and being transversely offset therefrom.

4,687,225

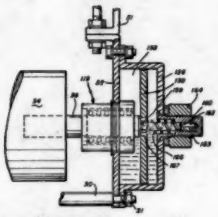
VEHICLE STABILIZER

Alan R. Newton, 67 Bluebird Ave., E. Wareham, Mass. 02571

Continuation of Ser. No. 728,585, Apr. 29, 1985, abandoned, which is a continuation of Ser. No. 340,308, Jan. 18, 1982, Pat. No. 4,530,518. This application Mar. 26, 1986, Ser. No. 844,080

Int. Cl.[4] B62D *37/04*

U.S. Cl. 280—758 **5 Claims**



1. A vehicle stabilizer comprising:

a frame means adapted to be secured to the vehicle,

a relatively weighty mass disposed in the frame means, said mass having outwardly extending end portions disposed thereon,

means for supporting said mass for axial bidirectional translation in said frame means between opposite ends of the frame means, said frame means having means defining a compression chamber at each end of the frame means,

a pair of pistons, one associated with each compression chamber, each piston having at least one aperture extending therethrough,

said means for supporting said mass comprising separate means, one at each end of the frame means, for supporting said end portions and defining with said end portions said oppositely disposed compression chambers, each chamber adapted to close as the end portion moves into contact with the aperture of said piston so as to provide substantial resistance to mass translation,

means supporting each piston for sliding motion in response to mass translation in a first direction and engagement of an end portion with the aperture of said piston, and

means for biasing each piston in a second direction,

wherein said piston aperture enables recharging of said compression chamber in response to mass translation in said second direction opposite to said first direction.

4,687,226

DEVICE FOR SUPPORTING BOUND MATERIAL

Robert D. Rose, Jr., Communications Packaging Corporation, 2635 S. Santa Fe Dr., Denver, Colo. 80223

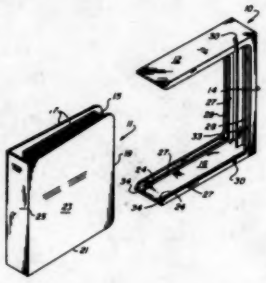
Continuation-in-part of Ser. No. 734,959, May 16, 1985, abandoned. This application Jul. 9, 1986, Ser. No. 883,616

Int. Cl.[4] B42D *17/00, 1/00;* **A47B** *23/00*

U.S. Cl. 281—45 **7 Claims**

1. A support device for bound materials including a cover, said cover having front and back covers interconnected by a spine, said device, comprising in combination:

a generally C-shaped cover, including a top member, spine member and lower member, each of said members having parallel slots formed therein for receiving free edges of said front and back covers and for holding said front and back covers in a pre-established, fixed position wherein said materials are completely enclosed and said covers are



positioned by said slots essentially parallel to each other, said mating slots of said upper and lower members formed by an outer wall and an inner wall, at least one of said inner walls including an integral guide surface, formed at an opening of said C-shaped cover, said guide surface defining an enlarged open mouth for receipt of said free edges and for spreading the covers and directing them down the slots.

4,687,227

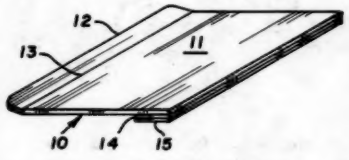
FILE CLIPS

Michael J. Kehoe, 2620 Third Ave. S., #3, Minneapolis, Minn. 55408

Filed Dec. 10, 1984, Ser. No. 680,280

Int. Cl.[4] B42D *17/00;* **G09E** *1/10;* **B42F** *17/00;* **B65D** *3/00*

U.S. Cl. 281—45 **6 Claims**



1. A clip for temporarily holding a memo or note on a surface, said clip comprising:

(A) an elongated strip of semi-rigid resilient sheet material,

(B) an upturned lip disposed along both opposite longitudinal edges of the sheet material, said lips both being upturned in one direction,

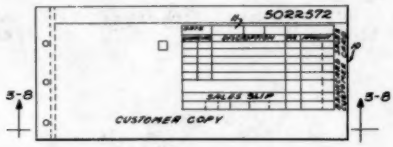
(C) a longitudinal strip of adhesive disposed on the opposite surface of the sheet material from the direction of said upturned lips, said adhesive strip parallel to said lips and spaced therefrom approximately midway between said lips.

4,687,228

CARBON SECURITY SYSTEM FOR CREDIT CARD SALES

Edmund G. Van Malderghem, Lewiston, and Thomas G. Pennock, North Tonawanda, both of N.Y., assignors to Moore Business Forms, Inc., Grand Island, N.Y.

Filed Aug. 21, 1986, Ser. No. 898,573
Int. Cl.[4] B41L *1/20*; B42D *15/00*; B65D *27/28*
U.S. Cl. 282—9 R 5 Claims



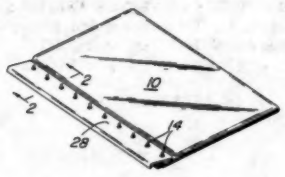
1. A credit card invoice set including:
a stub end having at least three plies affixed together,
at least three invoice copies attached to the stub end plies to provide top, middle and bottom copies,
a carbon ply attached to a ply of the stub end and extending between the top and middle copies,
a carbon ply attached to a ply of the stub end and extending between the middle and bottom copies,
a strip of reusable adhesive along a surface of a ply of the stub end,
lines of weakening across at least two of the copies outward of the places of attachment of the carbon plies to the plies of the stub end,
the arrangement being such that after removal of the two copies along the lines of weakening thereof the remaining copy may be folded over and the free end affixed to the adhesive strip with the carbon plies contained within the folded copy.

4,687,229

SPRING ACTUATED CLAMP

Richard E. Penniman, Gwynedd, Pa., assignor to R. E. P. Industries Inc., Lansdale, Pa.

Filed Dec. 23, 1985, Ser. No. 812,533
Int. Cl.[4] B41L *3/00*; B42D *17/00*; B42F *1/00, 5/00*
U.S. Cl. 282—29 B 10 Claims



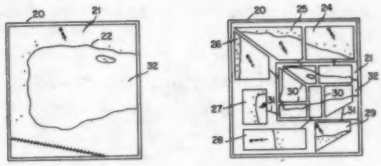
2. A clamp comprising:
hinge means having a hinge pin and first and second sets of alternately engaging knuckles pivoting about said hinge pin;
a leaf spring cantilevered from a fixed reference surface having a lateral edge;
a tab attached to said first set of knuckles, said tab slideably contacting said leaf spring;
a clamp arm attached to and rotating with said first set of knuckles, said clamp arm being baised towards said fixed reference surface when said tab contacts said spring on one side of a fulcrum and said clamp being biased away from said fixed reference surface when said tab contacts said spring on the opposite side of said fulcrum.

4,687,230

NAUTICAL CHART FOR PILOTING

John M. Landry, Sassaman Ct., Punta Gorda, Fla. 33955, and Paul L. Ravenna, Rd. 1, Box 33B, Waitsfield, Vt. 05673

Filed Jan. 9, 1986, Ser. No. 817,490
Int. Cl.[4] B42P *15/00*
U.S. Cl. 283—34 17 Claims



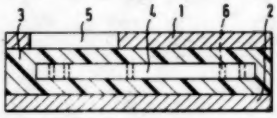
1. A nautical chart having a combination of indicia comprising:
(a) a small scale chart having a representation of a shoreline; and
(b) a plurality of large scale charts, said large scale charts in toto being a representation of a substantially continuous shoreline that extends said shoreline of said small scale chart, said nautical chart being printed on waterproof, tear resistant paper.

4,687,231

IDENTIFICATION CARD READABLE BY A MAGNETIC SYSTEM

Hans Hartmann, Stuttgart, Fed. Rep. of Germany, assignor to George Hartmann GmbH & Co. KG, Fed. Rep. of Germany

Filed Dec. 16, 1985, Ser. No. 809,379
Claims priority, application Fed. Rep. of Germany, Dec. 20, 1984, 3446412
Int. Cl.[4] B42D *15/00*
U.S. Cl. 283—82 17 Claims



1. An identification card to be read using a magnetic system, comprising:
two protective plates of sheet bronze, each protective plate defining an engagement surface;
at least one sheet-like data carrier comprising a material acting upon a magnetic field and having at least one data zone; and
an elastic layer situated between the protective plates and in engagement with the engagement surfaces to firmly join the protective plates, each data carrier being situated in the elastic layer and held therein in a protected manner.

4,687,232

PIPE SLIP JOINT SYSTEM

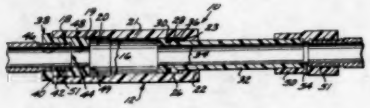
Zimmerman, Harry M., 5708 Baltimore Dr., #399, La Mesa, Calif. 92041

Continuation of Ser. No. 814,580, Dec. 27, 1985, which is a continuation of Ser. No. 522,198, Aug. 11, 1983, abandoned. This application Sep. 29, 1986, Ser. No. 912,696
Int. Cl.[4] F16L *21/02*
U.S. Cl. 285—31 5 Claims

5. In an expandable pipe coupling which comprises an elongated housing with an axial bore therethrough, a tubular hollow piston having head means and being telescopically mov-

able in said bore, flange means at a second axial end of said housing to retain said piston in said bore, an annular reducing bushing removably insertable into said bore at a first axial end of said housing to define the limit of travel with said flange means of said piston within said bore, and fluid-tight sealing means compressed the head of said piston and the inside wall of said bore; the improvement which comprises:

said axial bore having a greater diameter segment and a lesser diameter segment, the greater diameter segment



extending axially inwardly from said first end a distance greater than the length of that portion of said bushing which inserts into said bore; and

the portion of said greater diameter bore segment extending axially inwardly from the inner end of said bushing comprising an annular groove with which said sealing means registers when said piston is fully telescoped into said bore so that said sealing means is in a substantially uncompressed state when in registry with said groove.

4,687,233

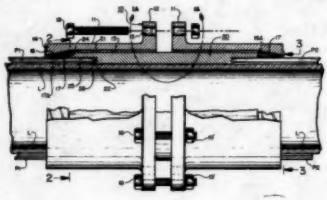
PIPE CONNECTOR STRUCTURE

William D. Edwards, South Jordan, Utah, assignor to R-Con International, Inc., West Valley City, Utah

Filed Sep. 15, 1986, Ser. No. 906,940

Int. Cl.[4] F16L *9/14*

U.S. Cl. 285—55 **8 Claims**



1. In combination, a pair of coaxially aligned pipe mutually spaced apart, a conduit liner disposed through said pipe pair, a split sleeve comprising a pair of hemicylindrical sleeve halves circumferentially disposed about and circumferentially engaging said conduit liner between said pipe pair, said sleeve halves each having remote ends and arcuate, inner, edge recesses proximate said ends and defining shoulders abutting said pipe pair, respectively, a pair of slit, pipe-gripping rings circumferentially disposed about respective ones of said pipe pair and directly abutting said ends of said sleeve halves, said rings having respective mutually remote ends and respective outer, annular, tapered surfaces constituting essentially frusto-conical surfaces tapering progressively radially inwardly proximate said remote ends, a pair of flange members each having a radially outwardly extending flange provided with mutually aligned attachment apertures and respective flange bodies integral with and extending in opposite axial directions from said flanges and over said split rings, respectively, and also over said split sleeve and conduit liner prior to the latter's initial fluid pressurization, said flange bodies having frusto-conically tapered interior end surfaces configured in correspondence with said outer frusto-conical surfaces of said rings, respectively, and attachment means engaging said flanges and said apertures for tightening said flanges toward each other to thereby cause said rings to contract and thereby grip said pipe proximate said ends of said sleeve halves.

4,687,234

CONNECTION COUPLING

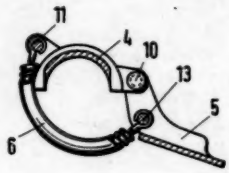
Karl Weinhold, Im Jagdfeld 43, 4040 Neuss 1, Fed. Rep. of Germany

Filed Sep. 10, 1986, Ser. No. 905,453

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1985, 3532505

Int. Cl.[4] F16L *33/12*

U.S. Cl. 285—244 **11 Claims**



1. Connection coupling comprising:

a bolt lever lock for fixing a thin-walled hose on a hose nipple, the outer circumference of which is provided with an annular groove (3) into which is pressed said hose pushed on said hose nipple by means of a coupling collar compressable by said bolt lever lock, said bolt lever of said lock being tiltably fixed at said collar and said collar comprising a portion formed of a helical spring (6);

one portion of said collar being formed of a half shell (4) with a radially inward circumferential depression (8) producing an internal circumferential bead, and the ends of the half shell (4) being provided with a sharp-edged reduction (9);

said bolt lever lock (5) being articulated at one end to said helical spring (6); and

the length of said helical spring (6) and the location of its fixing points (11, 13) at half shell (4) and at bolt lever lock (5) being selected such that there is a continuous circumferential compression of the hose, including that portion generally adjacent to said bolt lever lock.

4,687,235

FLUID POWER CONNECTOR FITTINGS

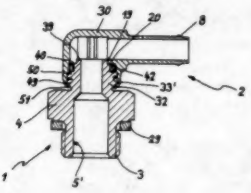
Kurt Stoll, Lenzhalde 72, 7300 Esslingen, Fed. Rep. of Germany

Filed Jan. 9, 1986, Ser. No. 817,511

Claims priority, application Fed. Rep. of Germany, Jan. 11, 1985, 8500579[U]

Int. Cl.[4] F16L *27/00*

U.S. Cl. 285—281 **9 Claims**



1. A fluid power connector fitting for the connection of a length of flexible hose to another structure, comprising a first connector section having one end carrying a first connector shank for connection to the other structure, and an opposite end carrying a male shank, said first connector section being made of one piece of material and having a duct section there-

through for carrying a fluid, and a second connector section having a second connector shank at one end, said second connector section being in the form of a one piece angled distributor piece having a recess at an end thereof opposite from said second connector shank, said distributor piece having a duct section extending therein and through said second connector shank, said duct section of said distributor piece communicating with said duct section of said first connector section and extending at an angle thereto to form a fluid passage through said first and second connector sections, said male shank extending into and being mounted for swivelling in said recess of said second connector section, said distributor piece being shaped adjacent its recess for retaining said male shank in said recess.

4,687,236

LOCK WITH PIVOTABLE SLIDES

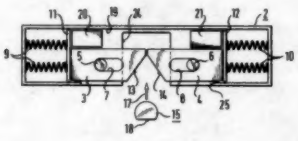
Dieter Rasche, Hauptstr. 21, 3052 Bad Nenndorf, Fed. Rep. of Germany

Filed Oct. 11, 1985, Ser. No. 786,686

Claims priority, application Fed. Rep. of Germany, Oct. 16, 1984, 3437806

Int. Cl.[4] E05C *19/02*

U.S. Cl. 292—16 **14 Claims**



1. A lock, in particular for doors or windows, comprising:
a housing having a base, a front wall, a rear wall, a first side wall and a second side wall;
a first aperture in the middle of said base;
a second aperture in the middle of said front wall having a width greater than said first aperture;
first and second vertical pivot pins mounted on said base between said first aperture and said second aperture;
a first translationally displaceable slider latch having a first slot therein adapted to be mounted on said first pivot pin and having a first end;
a second translationally displaceable slider latch having a second slot therein adapted to be mounted on said second pivot pin and having a second end, said ends mutually facing one another;
a first displaceable lock block located between said first latch and said rear wall;
a second displaceable lock block located between said second latch and said rear wall;
first spring biasing means mounted between said first side wall and said first lock block and said first latch;
second spring biasing means mounted between said second side wall and said second lock block and said second latch; and
a closing bolt adapted to enter said apertures having an undercut surface adapted to engage said latches in a closed position.

4,687,237

OVER-CENTER TOGGLE LATCH

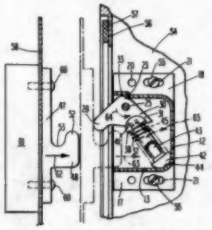
Robert H. Bisbing, Springfield, Pa., assignor to Southco, Inc., Concordville, Pa.

Filed May 1, 1986, Ser. No. 857,964

Int. Cl.[4] E05C *3/22*

U.S. Cl. 292—78 **6 Claims**

1. An over center toggle latch for securing two members together, said latch comprising:
(a) a latch housing adapted for being affixed to one of the members;
(b) a keeper having a base portion adapted for being affixed to the other of the members, and a dog projection connected to said base portion and extending therefrom, said dog projection adapted for being received within said housing and retained therein when the latch is in a closed position;
(c) a toggle member pivotally mounted within said housing for pivotal movement between a first position to receive said dog projection and a second position in overlying disposition to said dog projection and in sandwich orientation to said base portion and said dog projection, whereby said dog projection is retained within said housing;
(d) retaining means disposed within said housing and in pivotal contact with each of said housing and said toggle member for retaining said toggle member in said first and second positions, said retaning means comprising a first guide member having a sleeve portion and a head portion, said head portion having a generally convex outer surface in pivotal sliding engagement with a generally concave surface on said toggle member, a second guide member



having a rod portion and a head portion, said rod portion being disposed in sliding telescopic engagement with said sleeve portion of said first guide member, said head portion of said second guide member having a generally convex outer surface in pivotal sliding contact with an inner wall of said housing, and a coil spring disposed about said sleeve portion of said first guide member and contacting said head portions of said first and second guide members, said coil spring comprising means for urging said guide members apart and for urging said head portions into contact with said toggle member and said housing wall;
(e) wherein said base portion of said keeper comprises means for pivoting said toggle member from said first position to said second position upon the closing of said latch;
(f) wherein said dog projection of said keeper comprises means for pivoting said toggle member from said second position to said first position upon the opening of said latch; and
(g) wherein said dog projection of said keeper is disposed between said toggle member and said retaining means when said latch is in a closed position.

4,687,238

GATE LOCK

Daniel Mintz, 70 Cambridge Pl., Brooklyn, N.Y. 11238

Filed Jun. 16, 1986, Ser. No. 874,418

Int. Cl.[4] E05C *5/02*

U.S. Cl. 292—137 **14 Claims**

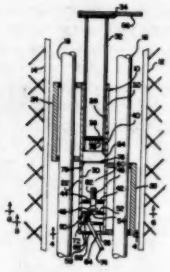
1. A gate lock for securing one or more movable gates comprising
a first housing secured to a first gate and a second housing secured in juxtaposed relationship to the first housing and adapted to be releasably locked to the first housing, the first and second housings defining a clearance space there-

between, the first and second housings having longitudinal bores;

a locking bolt in sliding relationship within the bore of the first housing, the bolt being of sufficient length to traverse the clearance space and enter the bore of the second housing, the locking bolt having a first unlocked position within the bore of the first housing and a second, locked position wherein a portion of the locking bolt is positioned within the bore of the second housing;

a key positioning means secured within the bore of the second housing to selectively receive and axially align an operating key,

the operating key comprising a handle and a key head secured to the handle,



the key positioning means comprising an inner positioning plate, the inner positioning plate having an axially aligned opening therethrough, the opening receiving an axially aligning the said key head; and

a threaded lock member positioned within the bore of the second housing in spaced relationship to the key positioning means, the lock member being of sufficient length to contact the locking bolt, the threaded lock member comprising a head having a shaped key receiving recess therein;

wherein the key head of the operating key is insertable through the key positioning means axially aligned opening to engage the key receiving recess in the threaded lock member to turn the threaded lock member to threadedly engage the locking bolt.

4,687,239

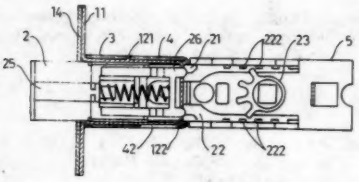
TUBULAR DOOR LOCK WITH AN ADJUSTABLE DEVICE FOR SETTING THE DEAD BOLT

Jui C. Lin, 297, Bor Ay Road, Kaohsiung, Taiwan (800)

Filed Jan. 3, 1986, Ser. No. 815,934

Int. Cl.[4] E05B *9/06*

U.S. Cl. 292—172 **2 Claims**



1. A tubular door lock comprising a lock casing having a face plate and a casing cylinder extending rearwardly from the face plate, a dead bolt with a rearwardly extending actuator plate mounted for lengthwise reciprocation in the casing cylinder, spring means connected between a back wall of the casing cylinder and the dead bolt biasing the dead bolt toward an extended position with respect to a forward end of the casing, a pulling plate extending through an opening in the back wall of the casing cylinder, the pulling plate having a hook connection with the actuator plate for retracting the dead bolt by rearward movement of the pulling plate, the pulling plate including spaced elongate rack gears extending rearwardly from the casing cylinder, an actuator assembly for moving the pulling plate comprising a segment gear journalled between a pair of assembly plates, the segment gear being located between the respective rack gears of the pulling plate, the segment gear having a rest position in which it is out of mesh with each of said rack gears whereby the segment gear can be moved lengthwise along the rack gears in the rest position, the segment gear further including a drive means for rotating same in opposite directions from the rest position to mesh with the respective rack gears thereby providing rearward movement of the pulling plate, and an adjustment means for varying the effective distance between the face plate and the segment gear, the adjustment means including adjustment cylinder means externally mounted on the casing cylinder, a bayonet connection between the casing cylinder and the adjustment cylinder means permitting selective lengthwise adjustment of the adjustment cylinder means on the casing cylinder between a retracted position and an extended position, and a mechanical connection between the adjustment cylinder means and said assembly plates whereby movement of the adjustment cylinder means between the retracted and extended positions with the segment gear in the rest position is effective to provide corresponding movement of the assembly plates and lengthwise movement of the segment gear along the rack gears.

4,687,240

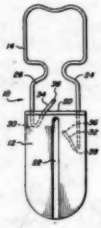
SECURITY SEAL OF THE PADLOCK TYPE

Allan W. Swift, Denville, N.J., assignor to E. J. Brooks Company, Newark, N.J.

Filed Mar. 18, 1985, Ser. No. 713,320

Int. Cl.[4] B65D *33/34*

U.S. Cl. 292—320 **4 Claims**



1. In a seal of the padlock type comprising a seal body having an aperture for receiving a reversely bent end portion of a shackle, said aperture and a said reversely bent end portion having dimensions such that the reversely bent end portion is maintained in a flexed condition when in the aperture so that the extreme end of the reversely bent end portion bears against a wall of the aperture, the improvement comprising a beveled surface formed on the extreme end of said reversely bent portion of the shackle to define a sharpened end, and a recess in the surface of the seal body associated with said aperture, the recess having a width at least as great as its depth, said sharpened end and said recess being configured and positioned in relation to each other that when excessive tension is applied to the shackle, said sharpened end penetrates the aperture wall and protrudes into the recess.

4,687,241

GRIPPER HEAD

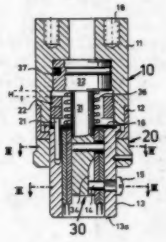
Ferenc Schell, Niedergosgen, Switzerland, assignor to Polytex AG, Glattbrugg, Switzerland

Filed Dec. 20, 1985, Ser. No. 811,287

Claims priority, application Switzerland, Dec. 21, 1984, 6118/84

Int. Cl.[4] B65H *3/22, 3/48*

U.S. Cl. 294—61 **13 Claims**



1. In a gripper head of the type for singly picking-up the upper most lying piece of cloth material or similar stickable material from a stack of such material pieces, the gripper head comprising a casing and at least two hollow cylinders, each cylinder defining an end face which faces towards the material pieces, the cylinders mounted concentrically and rotatably, the gripper head further comprising a plurality of needles mounted on the end face of each cylinder, the improvements comprising:

means for mounting the cylinders to permit axial translation of the cylinders with respect to the casing as well as opposed rotation of the cylinders;

means for rotating the cylinders in opposed directions in response to axial translation of the cylinders with respect to the casing, said rotating means comprising a guide slit located on each cylinder, each slit defining a pitch direction, the slits arranged on the cylinders such that the pitch direction of the slit of one cylinder is opposite to the pitch direction of the slit of at least one other cylinder; and

at least one return spring for biasing the cylinders in the axial direction to a rest position;

the casing, mounting means, guide slits and return spring operable under forces sufficient to overcome the bias of the return spring to rotate at least one cylinder and its associated needles in a direction opposite to the direction of rotation of at least one other cylinder and its associated needles during axial advancement of the cylinders and needles to a point whereby the needles extend beyond the edge of the casing.

4,687,242

APPARATUS FOR HANDLING SEMICONDUCTOR WAFERS DURING FABRICATION OF INTEGRATED CIRCUITS

Dick Van Rooy, 3134 Bal Moral, San Jose, Calif. 95132

Filed May 17, 1985, Ser. No. 735,182

Int. Cl.[4] B25B *11/00;* **B25J** *15/06*

U.S. Cl. 294—64.1 **5 Claims**

1. A semiconductor wafer handling apparatus comprising:

a body member, made of molded alumina, said body member having;

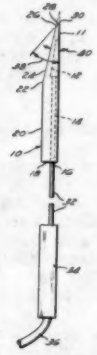
a first planar surface with a relief in said surface;

a second planar surface parallel to the first planar surface,

a rear planar surface at substantially right angles to said first and second planar surface forming a rear surface of the body member;

a third planar surface angled at a sharp acute angle compared to the first surface and forming a first intersection with said second planar surface, the first intersection parallel to said rear surface and;

a fourth planar surface angled at a less sharp acute angle compared to the first surface forming a second intersection with said third planar surface, the second intersection



parallel to said rear surface, said fourth surface additionally forming a third intersection with said first surface, the third intersection parallel to said rear surface; and

means for connecting said relief to means for generating air pressure differential.

4,687,243

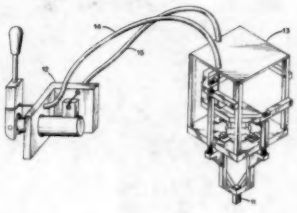
APPARATUS FOR HOLDING WORKPIECE

Francis B. Rienzo, Wakefield, Mass., assignor to GTE Government Systems Corporation, Waltham, Mass.

Filed Sep. 26, 1986, Ser. No. 911,709

Int. Cl.[4] A61F *1/06;* **B66C** *3/16*

U.S. Cl. 294—86.4 **1 Claim**



1. Apparatus for holding workpieces, comprised of:

a hand operated control unit;

a finger assembly;

a first cable including a first wire and a first jacket; and

a second cable including a second wire and a second jacket, said cables for coupling motion between said control unit and said finger assembly,

wherein

(a) said control unit is comprised of:

a housing having a first wall and a second wall orthogonal to said first wall;

means to secure said first jacket to said first wall;

means to secure said second jacket to said second wall;

said first wall defining a hole;

a shaft rotatably arranged in said hole having a first shaft segment extended from one end of said hole and a second shaft segment extending from the other end hole;

a handle pivotly arranged on the first segment of said shaft, said handle including first clasping means for

clasping said first wire parallel to the axis of said shaft; and

second clasping means attached to said second segment of said shaft for clasping said second wire tangent to said shaft; whereupon pivoting said handle actuates said first wire and rotating said shaft by said handle actuates said second wire,

(b) said finger assembly comprises:

a cage having an upper plate, and a lower plate, and a plurality of bars extending between said plates;

means for securing said first and second jackets to said upper plate;

a first fork having two arms joined by a first connecting segment, the free ends of said arms pivotly arranged on two of said bars;

means on said first connecting segment for clasping said first wire;

a first pair of opposing fingers, each finger having an upper end pivotly arranged on said lower plate and a lower end facing the lower end of the opposing finger of the first pair and a bracket between said upper end and said lower end; and

means for coupling each arm of said first fork to a bracket of a corresponding finger of said first pair of fingers;

a second fork having two arms joined by a second connecting segment, the free arms of said arms pivotly arranged of two of said bars;

means on said second connecting segment for clasping said second wire; and

a second pair of opposing fingers, each finger having an upper end pivotly arranged on said lower plate and a lower end facing the lower end of the opposing finger of the first pair and a bracket between said upper end and said lower end; and means for coupling each arm of said second fork to a bracket of corresponding fingers of said second pair of fingers.

4,687,244

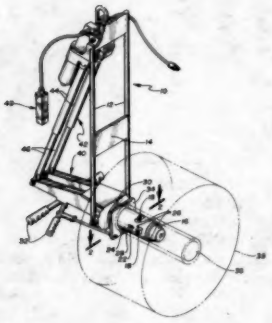
LIFT AND REORIENTING MECHANISM

Paul R. Cullen, Minneapolis, and Peter J. Schroeder, Plymouth, both of Minn., assignors to Tilt-Lock, Inc., Hamel, Minn.

Filed Sep. 20, 1985, Ser. No. 778,231

Int. Cl.[4] B66C *1/54*

U.S. Cl. 294—86.41 **13 Claims**



1. Apparatus for lifting and reorienting an object having an internal accessible axially extending opening, comprising:

(a) a frame;

(b) a probe pivotably carried by said frame and having at least one projection disposed for radial reciprocation relative thereto between a retracted position and an extended position;

(c) a sleeve assembly, having an outer surface substantially conforming to the object opening, encircling said probe and disposed for relative axial movement thereto between first and second positions, said sleeve assembly having an access port to permit passage of said projection therethrough;

(d) means urging said projections into its extended position when said sleeve assembly is in said first position, and for urging said projection into its retracted position when said sleeve assembly is in said second position; and

(e) means, coaxial with said probe and said sleeve assembly, for biasing said sleeve assembly to said first position.

4,687,245

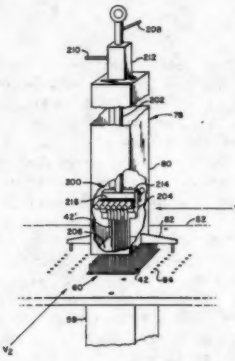
TOOL FOR PULLING MULTIPLE RODS FROM A NUCLEAR FUEL ASSEMBLY

Frank J. Formanek, West Suffield, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Continuation of Ser. No. 535,081, Sep. 23, 1983, abandoned. This application Jul. 14, 1986, Ser. No. 885,796

Int. Cl.[4] B66C *1/10;* **G21C** *19/10*

U.S. Cl. 294—87.1 **10 Claims**



1. A tool for grasping and lifting a subset of nuclear fuel rods, including rods of contiguous fuel rod grid cells, from a vertically oriented nuclear fuel assembly including fuel rod containing grid cells, comprising:

a gripper head including a frame generally oriented transversely to the fuel rods and mounted by means which permit the head to be oriented and fixed in two mutually perpendicular directions relative to the fuel assembly;

a plurality of jaw mechanisms symmetrically carried on opposite sides of the frame, each jaw mechanism having means for grasping a fuel rod, said grasping means being rectangularly spaced relative to each other in conformance with the spacing of a plurality of rods of contiguous fuel rod grid cells in the assembly;

an elongated shroud of uniform inner dimensions surrounding the gripper head;

means for moving the gripper head longitudinally within the shroud;

means operatively connected between the gripper head and the shroud, for maintaining the gripper head centered within the shroud during longitudinal movement therein;

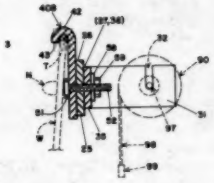
alignment means carried by the shroud for (establishing) fixing the shroud at a preselected position of the gripper head in either one of said two mutually perpendicular directions relative to the fuel rods, whereby a preselected subset of rods, at least some of which are from contiguous fuel rod grid cells, is grasped and lifted out of the assembly by the gripper head;

guide means at the lower end of the shroud for maintaining the spacing of the lower ends of the subset of fuel rods as they are lifted into the shroud by the gripper head.

4,687,246
VEHICULAR SUNRAYS-BARRIER ASSEMBLY

Canellen K. Mousel, 801 Eleventh St., Arapahoe, Nebr. 68922

Filed Oct. 17, 1986, Ser. No. 919,987
Int. Cl.[4] B60J 3/00
U.S. Cl. 296—97 G 11 Claims



1. Vehicular sunrays-barrier assembly interposeable between the external sun and an internal occupant of a windowed roadway vehicle having a variable-elevational, longitudinally extending, top-edge for a said transparent window pane, said barrier assembly being locateable substantially parallel to and immediately adjacent to a said window pane top-edge and being removably attachable thereat, and said vehicular sunrays-barrier assembly comprising:

(A) a non-transparent flexible shade convolutely wound around a longitudinally extending roller means having co-axial terminal pins characterized as a lead-pin and a trail-pin; and

(B) a bracket comprising a pair of relatively longitudinally movably associated bars including a first-bar and a second-bar, said bars being respectively provided with a transversely inwardly extending wing, one of said wings wholly surrounding a centrally apertured portion thereof to directionally longitudinally receive one terminal pin of a said roller means, another of said wings being provided with a downwardly notched portion to directionally downwardly receive the other terminal pin of a said roller means;

(i) said first-bar including a longitudinally extending first-length and also one of said wings, characterized as a leadwing, and

(ii) said second-bar including a longitudinally extending second-length in longitudinally movable relationship to said firstlength, and said second-bar also including the other of said wings, characterized as a trail-wing; arresting means for releasably maintaining some arbitrarily selected longitudinal inter-relationship between said bars; and at least two transversely outwardly extending hooks pivotably associated with at least one of said bars, and at least one of said hooks having a longitudinally adjustable condition along at least one of said bars, whereby said hooks are together adapted to removably attach said sunrays-bracket assembly to said longitudinally extending top-edge of some arbitrarily peripherally defined vehicular window pane.

4,687,247
POWERED TONNEAU COVER FOR CONVERTIBLE AUTOMOBILES

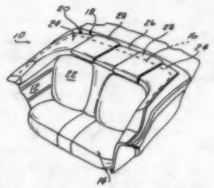
Peter P. Muscat, 14980 Waterfall Rd., Northville, Mich. 48167

Filed May 13, 1985, Ser. No. 720,349
Int. Cl.[4] B60J 7/20; B60N 1/06
U.S. Cl. 296—136 13 Claims

1. A powered tonneau cover arrangement for convertible automobiles of the type having a body having portions defining a passenger compartment with a passenger seat mounted therein said passenger seat having a back portion with an upper edge extending from side to side across said passenger compartment, said body also defining a convertible top storage space immediately to the rear of said passenger seat back portion and below said upper edge of said seat, the arrangement comprising:

a tonneau panel assembly including at least one rigid panel, said panel assembly configured to overlie and close said storage space;

said tonneau panel assembly rigidly mounted to said upper edge of said seat back portion so as to thereby extend at a

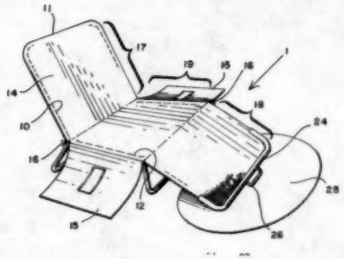


fixed angle to said seat back portion and be cantilevered to extend rearwardly from said seat back portion and normally overlie said storage space in an upright position of said seat back portion; means mounting said passenger seat back portion enabling forward tilting movement thereof from said upright position to thereby carry said cantilevered tonneau panel assembly forwardly at said fixed angle and open said storage sapce to enable access thereto.

4,687,248
CONVERTIBLE LOUNGE CHAIR/TOTE BAG

Richard S. Ross, Miami; John E. Friedman, and James A. Friedman, both of North Miami Beach, all of Fla., assignors to Tri-Rel, Inc., North Miami Beach, Fla.

Continuation of Ser. No. 748,328, Jun. 24, 1985, abandoned.
This application Sep. 19, 1986, Ser. No. 909,294
Int. Cl.[4] A45F 4/00; A47C 13/00
U.S. Cl. 297—129 5 Claims



1. A convertible three-sectioned lounge chair tote bag comprising, in combination,

side support bars,

end support bars, wherein said end support bars and said side support bars are grouped such that two side support bars and one end support bar are one continuous piece of metal such that said end support bar and said side support bars are generally perpendicular to one another and form a back support and a leg support, respectively,

base support bars,

support hinges, such that said support hinges connect said base support bars at one end of said support hinges forming a base support and connect said back and leg support, respectively, at the other end of said support hinges,

said support hinges having means to provide multi-angular locking positions such that said back and leg supports pivot from a substantially horizontal position to an upright vertical position and disengage to allow repositioning to said horizontal position when said back and leg supports

are pivoted to an angle less than 90° to that of the base support,

two legs wherein said legs are attached to said base support bars about said support hinges by means of a rivet thus forming leg hinges,

a polysynthetic contiguous cover material, such that said cover material is permanently attached about said back support, said leg support, and said base support and having on the edge of said end support bars handle grips attached thereto such that when said back and leg supports are in an upright position and said legs are pivoted to the folded position adjacent to base support, sides of an open-topped tote bag are formed,

said cover material having cover flaps such that said cover flaps are permanently attached to said cover material at and around the base support,

said cover flaps having a means for being releasably attached at their sides to the edge of said cover material adjacent to the back and leg supports, respectively, when said back support and said leg support are in an upright position thereby forming the sides of a variably sized volumetric capacity open-topped tote bag.

4,687,249

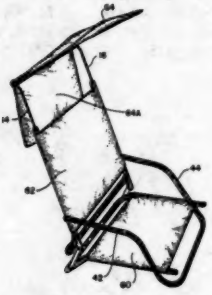
ADJUSTABLE CANOPY FOR A WHEEL CHAIR, BEACH CHAIR, AND THE LIKE

Sharyn A. Mills, 13240 Bloomfield St., Sherman Oaks, Calif. 91423

Continuation-in-part of Ser. No. 733,247, May 13, 1985, abandoned. This application Jun. 9, 1986, Ser. No. 871,884

Int. Cl.⁴ A47C *7/62*

U.S. Cl. 297—184 **8 Claims**



1. A canopy assembly for a chair, said chair including a pair of spaced and parallel upright tubular side members, and said canopy assembly comprising: a U-shaped frame having first and second elongated side members and an elongated cross member at the forward end thereof; third and fourth elongated side members to be telescopically and removably received in respective ones of said tubular side members of said chair; a tubular cross member secured to the upper ends of said third and fourth elongated side members; first and second frictional coupling assemblies for respectively coupling said first and second side members of said U-shaped frame member to said tubular cross member to permit said frame to be turned and set to any desired angular position; third and fourth frictional coupling assemblies for respectively coupling said third and fourth elongated side members to said tubular side members of said chair to permit said frame to be moved linearly with respect to said tubular side members and to be set at any desired linear position with respect thereto, and to permit said frame to be removed from said tubular side members, said third and fourth frictional coupling assemblies each including a bushing mounted in press fit in the end of the corresponding one of said tubular side members of said chair for receiving the corresponding one of said third and fourth elongated side members, and a radially acting spring member mounted on the lower end of the corresponding one of said third and fourth elongated side members in frictional engagement with the inner surface of the corresponding one of said tubular side members of said chair, said spring member having a tubular upper portion to be received in press fit with said bushing when the canopy is removed from the chair to enable said bushing to be held on the end of the corresponding one of said third and fourth side members upon such removal of the canopy from the chair.

4,687,250

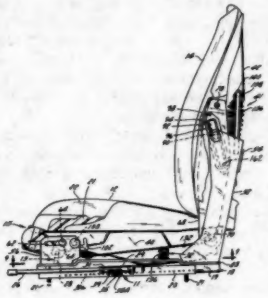
ADJUSTABLE SEAT ASSEMBLY FOR VEHICLE

John C. Esche, Hartford, Wis., assignor to Milsco Manufacturing Company, Milwaukee, Wis.

Filed Sep. 30, 1985, Ser. No. 782,112

Int. Cl.⁴ A42C *3/00*

U.S. Cl. 297—320 **14 Claims**



1. A seat assembly (**10**) for mounting on a vehicle comprising:

a support frame (**16**) having a fore end and an after end;

a set (**12**) having front and rear ends and lateral sides and movable fore and aft and pivotally relative to said support frame;

a backrest (**14**) having upper and lower ends and movable vertically and pivotally relative to aid support frame;

means (**56, 62, 60**) for pivotally and slidably connecting said seat (**12**) near the front end thereof to said support frame (**16**) near the fore end thereof to enable said seat (**12**) to be moved fore and aft and to pivot upwardly and downwardly relative to said support frame (**16**);

means (**68,92,90**) for pivotally and slidably connecting said backrest (**14**) intermediately of the upper and lower ends thereof to said support frame (**16**) near the aft and thereof to enable said backrest (**14**) to be moved upwardly and downwardly and to tilt fore and aft relative to said support frame (**16**);

means (**68, 70, 76**) for pivotally connecting said seat (**12**) near the rear end thereof to said backrest (**14**) near the lower end thereof so that fore and after movement of said seat (**12**) effected by an occupant of said seat (**12**) effects tiltiing movement of said backrest (**14**);

latching means (**13**) operable by said occupant for releasably latching said seat (**12**) to prevent fore and aft movement of said seat (**12**) and to prevent tilting movement of said backrest (**14**), said latching means (**13**) comprising:

first tilt latch means including pin means (**108**) mounted on said support frame (**16**), a mannually movable tilt adjustment member (**28**) mounted at the front end of said seat (**12**), second tilt latch means (**102**) including at least o:e slot (**106**) movably mounted on said support frame (**16**) and connected to said tilt adjustment member (**28**), said tilt adjustment member (**28**) being manually movable by said occupant between latched and unlatched positions

wherein it effects corresponding movement of said second tilt latch means (102) so that said slot (106) moves into and out of latched engagement, respectively, with said pin means (108) of said first tilt latch means, and biasing means (110) connected between said tilt adjustment member (28) and said seat (12) to bias said tilt adjustment member (28) and said second tilt latch means (102) in a latched position;

suspension means (41) for resiliently supporting said seat (12) and said backrest (14) to control downward pivotal seat movement and downward vertical backrest movement which occurs in response to said occupant's weight and road shock said suspension means (41) comprising: a cable (132), means including deflectable suspension spring means (136) connecting said cable (132) to the aft end of said support frame (16), and cable anchoring means (126) mounted on said seat (12) near the front end thereof, said cable (132) being connected to said cable anchoring means (126) and selectively movable relative to said seat (12) to move said cable (132) and thereby adjust the deflection of said suspension spring means (136); and

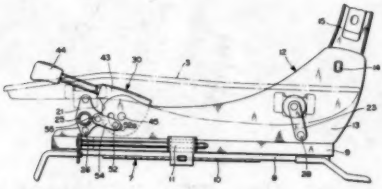
means (15) operable by said occupant for adjusting the deflection of said supension spring means (136) to accommodate said occupant's weight and road shock and comprising a mannually movable member (112, 30) movably mounted on the front end of said seat (12) for manual movement by said occupant and operatively connected to effect adjusting movement of said cable anchoring means (126).

4,687,251

SEAT CUSHION FOR VEHICLES

Kenichi Kazaoka, Nagoya; Hiroshi Okazaki, Toyota, and Yasuhisa Inaba, Handa, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Japan

Filed Jun. 20, 1985, Ser. No. 746,865
Claims priority, application Japan, Jun. 22, 1984, 59-127605
Int. Cl.[4] A47C *1/022*; B60N *1/02*
U.S. Cl. 297—337 **8 Claims**



1. A vehicle seat assembly, comprising:

bracket means mounted along a vehicle floor for slidably supporting the vehicle seat;

a backrest pivotally attached to a rearward portion of said bracket means;

a seat frame pivotally mounted on said bracket means, said seat frame having a rearward section substantially adjacent said backrest and a forward section spaced forward of said backrest;

pivot means connected to said bracket means and said seat frame for pivoting said seat frame backward and forward relative to said backrest, said pivot means including link members pivotally attached between said bracket means and said seat frame;

manually-actuated clutch means connected to one of said link members for controlling the position of said pivot means, said clutch means including:

shaft means rotatably mounted on said bracket means;

an operating lever fixedly mounted on said shaft means;

an eccentricity mounted disc plate rotatably supported on said shaft means;

locking means for engaging said disc plate when said operating lever is released to lock said disc plate; and

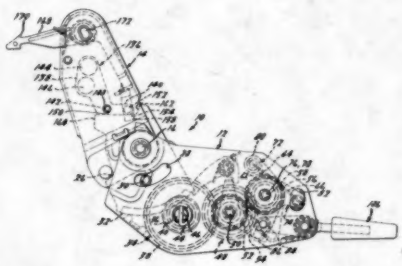
link means connected to said disc plate and said one of said link members for spacing said forward section of said seat frame a desired amount from said backrest in response to rotation of said operating lever, said link means including a pin eccentrically mounted on said disc plate and a connecting link, said connecting link being pivotally connected at one end to said pin and pivotally attached at an opposite end to said one of said link members.

4,687,252

SEAT RECLINER MECHANISM WITH SPRING COIL ACTUATOR AND REDUNDANT POSITIONING

Robert L. Bell, Oxford, and Tyrone R. Secord, Sterling Heights, both of Mich., assignors to Fisher Dynamics Corporation, St. Clair Shores, Mich.

Filed Jul. 1, 1985, Ser. No. 753,047
Int. Cl.[4] B60N *1/02*
U.S. Cl. 297—374 **22 Claims**



1. A seat recliner mechanism for supporting a seat back and a seat bottom which permits the angle therebetween to be controllably varied comprising:

a lower recliner structure supporting said seat bottom,

an upper recliner structure supporting said seat back,

a first pivot rotatably attaching said lower recliner structure to said upper recliner structure,

a toothed rack operatively connected to one of said upper or lower recliner structures,

gear means carried by the other of said upper or lower recliner structures for engaging said toothed rack and controlling the positioning of said toothed rack,

an actuator clutch drum carried by the other of said upper or lower recliner structures and rotatably driven by said gear means,

a unitary coil clutch spring wrapping around said actuator clutch drum, said coil clutch spring having first and second spring ends,

first spring engaging means carried by the other of said upper or lower recliner structures for engaging said first spring end,

second spring engaging means carried by the other of said upper or lower recliner structures for engaging said second spring end, and

actuation means carried by the other of said upper or lower recliner structures for producing relative movement between said first and second spring engaging means thereby moving said first and second spring ends from an engaged position in which said coil clutch spring frictionally engages said clutch drum such that said first spring engaging means restrains rotation of said actuator clutch drum in a first rotational sense and said second spring engaging means restrains rotation of said clutch drum in a second rotational sense wherein the relative angular positioning between said lower and upper recliner structures is established, to a disengaged position in which said coil clutch

spring frictionally disengages said actuator clutch drum wherein the relative angular positioning between said lower and upper recliner structures is adjustable.

4,687,253

SAFETY-BELT SYSTEM

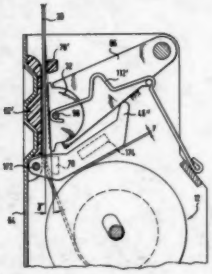
Hans-Hellmut Ernst, Süilfeld, and Edmund Lochbihler, Munich, both of Fed. Rep. of Germany, assignors to Britax-Kolb GmbH & Co., Dachau, Fed. Rep. of Germany

Filed Dec. 20, 1985, Ser. No. 811,683

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1984, 3446857; Dec. 12, 1985, 3543959

Int. Cl.[4] B60R *21/00*

U.S. Cl. 297—478 **31 Claims**



1. Safety-belt system comprising a belt and a winding and locking mechanism having a sensor and control mechanism and a clamping device having a controlled clamping portion for preventing belt withdrawal from the winding and locking mechanism, said clamping portion being operatively coupled to respond to movement of at least a part of the winding and locking mechanism relative to the winding housing, so that responsive to this relative movement the clamping portion is movable into clamping engagement with the belt, wherein, when in operation, blocking of the belt is initiated only by the clamping portion and only via blocking action of the sensor and control mechanism when the acceleration exceeds car-sensitively a low limit value of e.g. about 0.45 g (CS) and web-sensitively a low limit value of e.g. about 1.5 g (WS).

4,687,254

BELT LOCK ARRANGED RECESSED IN A POCKET OF A SEAT PART

Heinz Baumert, Sindelfingen; Nikolaus Schmitt-Maass, Boeblingen, and Erich Karb, Calw-Alzenberg, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

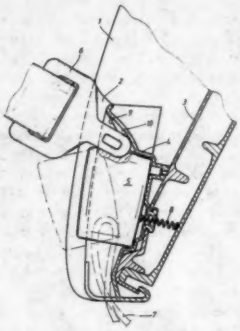
Filed Aug. 25, 1986, Ser. No. 900,080

Claims priority, application Fed. Rep. of Germany, Aug. 23, 1985, 3530172

Int. Cl.[4] B60R *21/00*

U.S. Cl. 297—481 **6 Claims**

1. A seat belt latch mechanism arranged recessed in its non-use position in a pocket of a seat part, elastically stressed and provided with a receiving funnel, which can be transferred by means of a pivot movement from its non-use position into a use position enabling the insertion of a buckle latch, comprising shell means lining the pocket, said shell means being provided



with a guide surface means, along which the emplaced buckle latch slides in the direction of the receiving funnel.

4,687,255

ADJUSTABLE TODDLER CAR SEAT

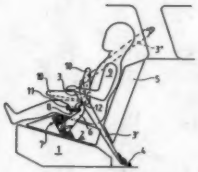
Wilfried Klanner, Starnberg; Dieter H. Schmaler, Olching; Hermann Wetter, Ulm/Donau; Bernhard Felsch, Münsind, and Waldemar Czernakowski, Blaustein, all of Fed. Rep. of Germany, assignors to Romer-Britax Autogurte GmbH, Ulm-/Donau and ADAC E.V., Munich, both of, Fed. Rep. of Germany

Filed Feb. 10, 1986, Ser. No. 828,013

Claims priority, application European Pat. Off., Feb. 9, 1985, 85101397.7

Int. Cl.[4] B60N *1/12*; B60R *22/10*

U.S. Cl. 297—488 **13 Claims**



1. A toddler seat for an automotive vehicle having a vehicle seat with a back, a seat surface extending forwardly from said back, and a seat belt anchored below said surface and adapted to extend upwardly and forwardly in a passenger-restraining position of the seat belt from points at which said seat belt is anchored on said vehicle, said toddler seat comprising:

a base adapted to rest upon said surface and having a seating surface upon which a toddler can be seated with the back of the toddler resting against said back of the vehicle seat, said base having a pair of generally vertical sides extending downwardly from and flanking said seating surface of said base;

respective upwardly and forwardly inclined guides formed on said sides of said base and oriented generally parallel to said seat belt in said passenger-restraining position thereof;

a respective rigid arm having a lower end engaging and guided in each of said guides for movement therealong up and down generally parallel to said seat belt in said passenger-restraining position thereof, each of said arms having an upper end lying above said seating surface of said base and provided with a respective pin fixed in position on the respective arm extending generally in a direction of travel

of the vehicle and below which said belt can pass around said toddler to retain said toddler on said base;

locking means for frictionally securing each of said lower ends in position along the respective guides, said arms being constructed and arranged to maintain substantially fixed angular relationships with the respective guides in all possible selected positions of said lower end up and down along the respective guides; and

a shield engageable by said pins with said arms and adapted to hold a toddler of small size in place on said base, said seat belt passing around said shield when said shield is engaged by said pins on said arms.

4,687,256

PROCESS FOR MANUFACTURING A NATURAL FIBER MOP

Peter G. Demetriades, 601 Wakefield Ave., Henderson, N.C. 27536

Division of Ser. No. 648,248, Sep. 7, 1984, Pat. No. 4,615,065. This application Apr. 17, 1986, Ser. No. 837,790

Int. Cl.[4] A46B *15/00*; A47L *3/20*

U.S. Cl. 300—21 **11 Claims**

1. A process for making a mop for treating surfaces comprising:

providing a plurality of natural fibers possessing natural oils inherent in said fibers,

gathering said fibers together,

securing said fibers together at one location at least to form a mop,

chronologically subsequent to the above step of providing said fibers, the step of, applying to said fibers a sufficient amount of a surfactant while retaining substantially all the natural oils of said fibers in order to produce up to 4.0 percent by weight of surfactant per weight of said fiber on said fibers,

whereby said mop possesses improved liquid retention properties without the conventional breaking-in or rinsing of the mop.

4,687,257

METHOD OF MAKING BRUSHES, AND BRUSHES THUS MADE

Leif E. Stern, Fattershus, S-225 90 Lund, Sweden

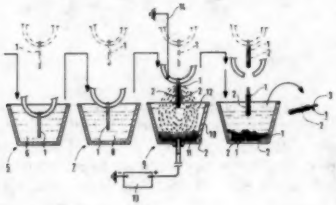
PCT No. PCT/SE85/00379, § 371 Date May 29, 1986, § 102(e) Date May 29, 1986, PCT Pub. No. WO86/01984, PCT Pub. Date Apr. 10, 1986

PCT Filed Oct. 1, 1985, Ser. No. 871,411

Claims priority, application Sweden, Oct. 1, 1984, 8404885

Int. Cl.[4] A61C *15/00*

U.S. Cl. 300—21 **10 Claims**



1. A method of making brushes for cleaning preferably bacteria-polluted surfaces, particularly the skin, gums or teeth, in which a body of the brush is provided with designed to collectively form a uniformly distributed bristle covering on the brush body or parts thereof, comprising the steps of: supplying a surface of polyamide material of the brush body with a water-soluble organic acid to dissolve the brush body surface of polyamide material, and attracting bristles of to the brush body by electrostatic attraction so that end portions of each bristle which come in contact with the dissolved surface of the brush body are dissolved and caused to fuse with said surface to form a brush in which the body and all bristles are integrated into a unit.

4,687,258

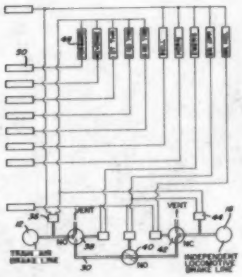
REMOTE CONTROL SYSTEM FOR A LOCOMOTIVE

George W. Astley, Edmonton, Canada, assignor to Canadian National Railway Company, Montreal, Canada

Filed Dec. 11, 1985, Ser. No. 807,609

Int. Cl.[4] B60T *13/68*

U.S. Cl. 303—3 **16 Claims**



1. Remote control system for a locomotive having a train air brake line and an independent locomotive brake line comprising:

said train air brake line connected to operate the brakes on the entire train;

said independent locomotive brake line connected to operate only the brakes of the locomotive of the train;

air link between the train air brake line and the independent locomotive brake line;

brake control valve means in the air link;

operating means for the brake control valve means utilizing air from the train air brake line to control air pressure in the independent locomotive brake line;

receiver means attached to the locomotive for receiving radio instructions and producing signals for the operating means for the brake control valve means, direction of travel and throttle position for the locomotive; and

transmitter means having control switches for an operator remote from the locomotive to send radio instructions to the receiver means.

4,687,259

HYDRAULIC BRAKE SYSTEM WITH SLIP CONTROL

Hans D. Reinartz, Frankfurt am Main, and Helmut Steffes, Eschborn, both of Fed. Rep. of Germany, assignors to Alfred Toves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed May 8, 1985, Ser. No. 732,241

Claims priority, application Fed. Rep. of Germany, May 9, 1984, 3417018

Int. Cl.[4] B60T *8/44*

U.S. Cl. 303—114 **1 Claim**

1. A hydraulic brake system with slip control for automotive vehicles, having vehicle wheels said system comprising, in combination:

a master cylinder having a working chamber therein;

a plurality of wheel brakes respectively associated with said vehicle wheels;

a plurality of pressure fluid lines respectively connecting said working chamber of said master cylinder to said wheel brakes;

a pedal-operated hydraulic power booster for actuating said

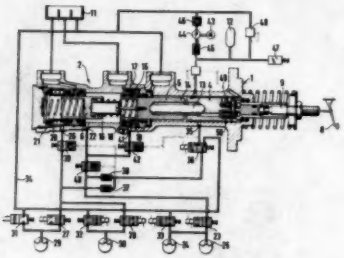
master cylinder in response to a brake pedal, said power booster having a pressure chamber therein;

an unpressurized fluid supply reservoir which communicates with said pressure chamber in brake release position of said brake pedal;

a plurality of normally open control valves respectively provided in said pressure fluid lines;

a plurality of normally closed drain valves respectively hydraulically connected between said wheel brakes and said unpressurized fluid supply reservoir;

a three-way/two-position directional control valve connected between said pressure chamber, said pressure fluid lines and said unpressurized fluid supply reservoir to alternately connect said pressure chamber to said pressure



fluid lines or said unpressurized supply reservoir in response to a slip control signal; and,

first and second non-return valves with each non-return valve being connected between said directional control valve and one of said pressure fluid lines, said non-return valves being connected to provide unidirectional pressure fluid flow from said directional control valve to said pressure fluid lines, wherein said hydraulic power booster includes first and second ball seat valves connected between said pressure chamber and a pressurized fluid supply reservoir, said first and second ball seat valves being responsive to said pedal for metering fluid from said pressurized fluid supply at a pressure level proportional to actuating force applied to said pedal.

4,687,260

ANTISKID CONTROL DEVICE

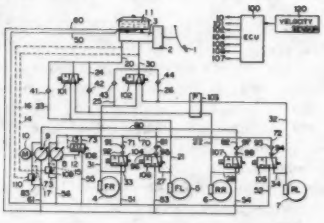
Kazuma Matsui, Toyohashi; Yoshiyuki Hattori, Toyoake; Yuichi Imani, Hamamatsu; Akira Kuno, Obu, and Yoshihisa Nomura, Toyota, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan

Filed Nov. 1, 1985, Ser. No. 793,760

Claims priority, application Japan, Nov. 1, 1984, 59-228890; Apr. 7, 1985, 60-80291; Apr. 24, 1985, 60-86226; Jun. 6, 1985, 60-123450

Int. Cl.[4] B60T *8/02*

U.S. Cl. 303—119 **15 Claims**



1. An antiskid control device controlling pressure in the wheel cylinders of a brake system provided in a vehicle for preventing the vehicle from skidding through locking of the wheels thereof, said device comprising:

a first hydraulic oil source generating pressurized oil for a usual brake operation,

a second hydraulic oil source generating pressurized oil for an antiskid control brake operation,

a hydraulic oil reservoir containing a supply of hydraulic oil and connected to said first and to said second hydraulic oil sources and supplying oil thereto,

a main line system having a main line connecting said first hydraulic oil source to said wheel cylinders, and a cut-off valve for opening and closing said main line,

a means for switching said cut-off valve to normally open said main line, and to close said main line when a locking condition occurs in said wheels of the vehicle,

a subline system having a subline connecting said second hydraulic oil source to said wheel cylinders, and a switching valve opening and closing said subline, said switching valve having first, second, and third ports connected, respectively, to said second hydraulic oil source, the wheel cylinders, and said reservoir, and

a means for controlling said switching valve to open or close according to the locking condition of the wheels.

4,687,261

TRACKS FOR TRACK-LAYING VEHICLES

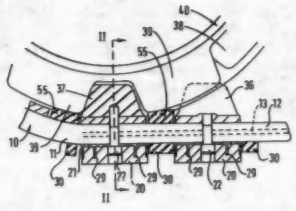
Howard S. Atkin, Sutton Coldfield, England, assignor to Dunlop Limited, United Kingdom

Filed Sep. 10, 1985, Ser. No. 774,483

Claims priority, application United Kingdom, Sep. 26, 1984, 8424265

Int. Cl.[4] B62D *55/088, 55/096, 55/275*

U.S. Cl. 305—57 **16 Claims**



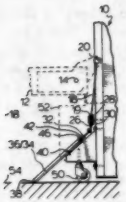
1. A track assembly for a track-laying vehicle comprising a flexible belt arranged to pass around a driving sprocket and load-supporting wheels of the vehicle said belt having inner rigid driving members secured to its inner surface to provide drive and guidance for the belt, successive driving members being staggered with respect to the center line of the track so that successive driving members are engageable with opposite sides of a driving sprocket to enable the belt to be driven only by alternate engagement of driving members with opposite sides of the driving sprocket, the driving sprocket having wedge-shaped notches formed alternately in opposite side faces of the sprocket for engagement with the successive driving members, providing both drive and lateral guidance, the driving members and the notches being complementarily shaped with the smaller ends of the driving members directed into the notches.

4,687,262

ANTI-TILT SYSTEM FOR APPLIANCES

Robert M. St. Louis, St. Leonard, Canada, assignor to Camco Inc., Mississauga, Canada

Filed Sep. 17, 1986, Ser. No. 908,244
Claims priority, application Canada, Nov. 29, 1985, 496577
Int. Cl.[4] A47B *97/00*
U.S. Cl. 312—276 **7 Claims**



1. An appliance comprising:

a cabinet adapted to be supported on a floor including a bottom end and a front downardly opening door pivotally mounted adjacent to the bottom end for pivoting on a substantially horizontal axis between an elevated closed position and a lowered open position, said cabinet having a longitudinal center line;

a pair of legs each terminating at one end in a foot portion, each leg of said pair of legs being pivotally mounted, one on each side of the longitudinal center line, on a pivotal axis fixed relative to and oriented relative to said cabinet, each leg of said pair of legs being pivotally movable around the pivotal axis between a first retracted position and a second floor engage position located downwardly and forwardly of the first position where the foot portion of each leg engages the floor to further support said cabinet; and,

connecting means for connecting each of said legs with said door comprising a pair of cables connected one to each side of said door, a pair of brackets being interconnected by tension spring means, each of said pair of brackets being connected to one of the pair of cables and one of the pair of legs adjacent the pivotal axis such that when the door is moved from the closed position to the open position said cables move said brackets in opposing directions away from each other to tension the spring means and to move each leg around the pivotal axis in a first angular direction thereby moving said pair of legs from the first retracted position into the second floor engage position and movement of said door from the open position to the closed position causes said brackets to move towards each other due to contraction of the spring means and to move each leg around the pivotal axis in a second angular direction opposite to the first angular direction thereby moving said pair of legs from the second floor engage postiion to the first retracted position.

4,687,263

SHIELDING KIT FOR ELECTRICAL CONNECTORS TERMINATING MULTICONDUCTOR 360 DEGREE SHIELDED CABLE

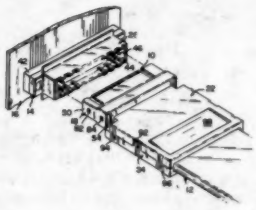
Pete Cosmos, Mechanicsburg; Michael J. Scully, Harrisburg, and Brian D. Stephenson, Camp Hill, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 474,116, Mar. 10, 1983, abandoned.
This application May 27, 1986, Ser. No. 868,897
Int. Cl.[4] H01R *13/648, 4/24, 13/58*
U.S. Cl. 439—108 **11 Claims**

1. An RF/EMI shielding kit for enclosing both the plug and receptacle portions of an electrical connector, comprising a flat multi-conductor cable enclosed within 360° of conductive shielding and an outer insulative sheath, a ground path for said shielding kit,

a plug shield assembly formed by at least two mating metal shells together defining a connector plug receiving cavity therebetween, each said shielding shell having an integral T-shaped flange extending from one side thereof in the direction of the cable with the cross bar portion lying normal to the axis of the cable, the length of said cross bar portion being approximately twice the width of said cable shield and being provided with a patterned array of projections and corresponding apertures formed in said cross bar portion, each aperture surrounded by a plurality of tines, all said tines and said projections extending from a single face of said flange, said cross bar portion being adapted to be folded upon itself to entrap a shielding layer of said cable therebetween with said projections engaging respective apertures;

a receptacle shield assembly formed by at least one metal



member having a plurality of tines extending from at least one marginal edge and folded back upon said member to lie within the cavity of said receptacle, said member at least partially enclosing the outer periphery of said receptacle, and means for connecting said member to ground;

wherein said at least two mating metal shells comprise

first and second mating front shells together defining a cavity receiving a front portion of said connector plug, and

a back shell defining a cavity receiving a rear portion of said connector plug,

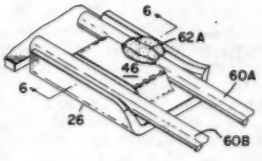
said first and second mating front shells each having an integral T-shaped flange and said back shell having a pair of oppositely directed T-shaped flanges whereby a connector plug terminating a fully shielded cable intermediate its ends can be fully shielded with the first and second front shells engaging the shield on one side of the cable and the back shell engaging the shield on the other side of said cable.

4,687,264

DUAL SLOT ELECTRICAL CONTACT AND METHOD OF MAKING SAME

John R. Shuey, Mechanicsburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jul. 3, 1986, Ser. No. 882,047
Int. Cl.[4] H01R *4/66*
U.S. Cl. 439—92 **14 Claims**



1. A contact terminal for terminating two small diameter

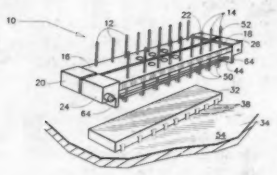
conductor wires without substantially distorting the conductor wires comprising a forward contact section and a rearward termination section, said rearward termination section including a spaced pair of conductor-receiving slots extending forwardly from a rearward end thereof, inner walls of said slots defined by parallel vertical side surfaces of a central boss of selected width struck upwardly from said termination section, and outer walls of said slots comprised of parallel side walls of said termination section bent vertically upwardly from side portions thereof and having inside surface portions spaced from respective said side surfaces of said central boss defining respective said conductor-receiving slots, said side walls having inwardly directed rounded bosses centered above adjacent top surface portions of said central boss and spaced from said central boss side surfaces distances selected to be just less than the diameter of a respective conductor wire, and said slots each having a depth below said rounded bosses approximately equal to the diameter of a said conductor wire, so that top portions of a said conductor wire disposed therein are approximately coplanar with said adjacent top surface portions of said central boss, such that said conductor wires are forceable between said rounded bosses and said central boss during wiping of said wires into respective said slots and are holdable thereby in said slots for laser weld termination.

4,687,265

CONNECTOR FOR COMPONENT MOUNTED ON CIRCUIT BOARD

Curtis F. Johnson, and Douglas J. Gilbert, both of Encinitas, Calif., assignors to San Diego Levco Corporation, San Diego, Calif.

Filed May 27, 1986, Ser. No. 868,762
Int. Cl.⁴ H01R *23/72*
U.S. Cl. 439—68 **10 Claims**



1. An electrical connector useful for temporary attachment to first and second sets of linearly arrayed electrical contacts on opposite exposed sides of a rectangular-block-shaped electrical component, such as an integrated circuit chip, mounted on a circuit board, comprising

a first set of linearly arrayed conductive pins for connection to the first set of contacts;

a second set of linearly arrayed conductive pins for connection to the second set of contacts;

first holding means for holding the first set of pins in a spaced linear alignment, with the pins being spaced in accordance with the spacing of the first set of contacts of the board-mounted component, with a first end portion of each pin being disposed beneath the first holding means for connection to a corresponding contact of the board-mounted component when the first holding means is positioned over the board-mounted component for attaching the connector thereto, and with the other end portion of each pin being exposed for connection to some other electrical component when the first holding means is positioned over the board-mounted component for attaching the connector thereto;

second holding means for holding the second set of pins in a spaced linear alignment with the pins being spaced in accordance with the spacing of the second set of contacts of the board-mounted component, with a first end portion of each pin being disposed beneath the second holding means for connection to a corresponding contact of the board-mounted component when the second holding means is positioned over the board-mounted component for attaching the connector thereto, and with the other end portion of each pin being exposed for connection to some other electrical component when the second holding means is positioned over the board-mounted component for attaching the connector thereto; and

clamping means for forcing the first and second holding means toward each other when the first and second holding means are positioned over the board-mounted component for attaching the connector thereto to cause the first end portion of each pin to firmly press against the corresponding contact of the board-mounted component;

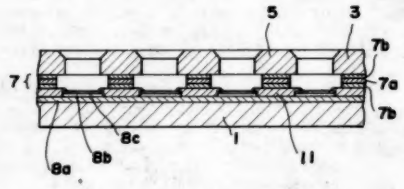
wherein each holding means comprises a slab holding the pins in the spaced linear array and so dimensioned that when the holding means are positioned over the board-mounted component and forced together to cause the pins to press against the contacts of the board-mounted component, the slab of the first holding means presses against the slab of the second holding means to counteract a bending moment applied to the holding means by the pressure of the pins against the contacts.

4,687,266

ELECTRICAL CONNECTING TERMINAL

Junichi Tanii; Toshio Yamaki, and Kiyoshi Seigenji, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Japan

Filed Aug. 8, 1985, Ser. No. 763,738
Claims priority, application Japan, Aug. 11, 1984, 59-123362[U]
Int. Cl.⁴ H05K *1/00*
U.S. Cl. 439—77 **13 Claims**



1. An electrical connecting terminal comprising:

a substrate;

a plurality of electrical contacts disposed on said substrate;

a frame member having a plurality of apertures corresponding to said electrical contacts, and having wall portions in enclosing registry within individual apertures; and

waterproof double faced bonding sheet means having a plurality of apertures corresponding to said apertures of said frame member and adhesive sheet portions corresponding to said wall portions so as to individually enclose said respective apertures, said sheet portions bonding said frame member to said substrate so that said wall portions and said sheet portions individually surround each electrical contact thereby providing a water resistant separation between said contacts.

4,687,267

CIRCUIT BOARD EDGE CONNECTOR

Stephen Header, Chambersburg; Jerry L. Moore, Harrisburg, and Attalee S. Taylor, Palmyra, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jun. 27, 1986, Ser. No. 879,790
Int. Cl.⁴ H01R *9/09*
U.S. Cl. 439—62 **7 Claims**

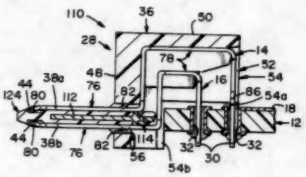
1. A circuit board edge connector for electrically connecting conductive means on a circuit board to conductive means in a

connecting mating means having a card slot, said connector comprising:

dielectric housing means having body means and blade means, said body means having front and top walls and a plurality of inner walls attached to and extending normally from said front and top walls to define a plurality of rearwardly and downwardly open cavities, raised means on each surface of said inner walls projecting into said cavities and each having upper and lower parallel channels, said body means further having upper and lower, spaced slots extending through said front wall from each of said cavities, said blade means attached to and projecting forwardly from said front wall such that said upper slots open onto an upper surface and said lower slots open onto a lower surface on said blade means, said blade means further having grooves on each upper and lower surfaces in registration with and extending from respective upper and lower slots; and

first and second electrical contact means with each having elongated finger means at one end for electrical engagement with conductive means in a connecting mating means, engaging means at another end for electrical engagement with conductive means on a circuit board and disposed at right angles at the longitudinal axis of said contact means, retention means intermediate said finger and engaging means and having laterally projecting ears on each side thereof and lance means on and projecting from said finger means adjacent said retention means, said first electrical contact means being positioned in said housing means with said finger means extending through respective upper slots and along respective grooves on said upper surface of said blade means, said engaging means extending downwardly from respective cavities,

said ears on said retention means received in respective upper channels in respective cavities and said lance means engaging a wall of respective upper slots, said second electrical contact means being positioned in said housing means with said finger means extending through respective lower slots and along respective grooves on said lower surface of said blade means, said engaging means extending downwardly from respective cavities, said ears on said retention means received in respective lower channels in respective cavities and said lance means engaging a wall of respective lower slots.



4,687,268

CONNECTOR FOR PROVIDING ELECTRIC CONNECTION BETWEEN A PORTABLE ELECTRONIC DEVICE AND CONDUCTORS OF A FIXED PROGRESSING SYSTEM

Robert Picciotto, Paris; Francois Ramel, Levallois; Alain Rousseau, and Philippe Touzin, both of Paris, all of France, assignors to Electronique CKD, France

Filed Dec. 31, 1985, Ser. No. 814,949

Claims priority, application France, Jan. 9, 1985, 85 00226

Int. Cl.[4] H01R *23/70*

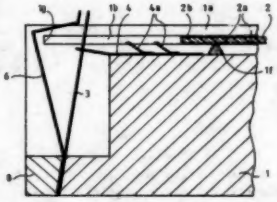
U.S. Cl. 439—55 **13 Claims**

1. Connector for a portable electronic device having a plane contact face provided with a plurality of contact studs, at least one guide portion and at least one abutment element, this connector comprising a fixed structure having for each of said contact studs, one corresponding fixed conductor, first guiding means in which said guide portion may be engaged and slide according to an insertion direction until said electronic device has reached a connection position in which said phase contact face extends in a determined plane, and a connection device which comprises:

a resiliently deformable portion having an end portion fixedly mounted on a part of the fixed structure which includes the fixed conductors;

a support portion guided by a second guiding means provided on the fixed structure, so as to be movable in translation parallel to said determined plane and at a small distance therefrom, said support portion being connected to a connecting zone of the resiliently deformable portion which is distant from said end portion;

a plurality of resiliently deformable contact holders fixedly mounted on said support portion and each comprising a sliding contact member projecting slightly with respect to said determined plane and located so as to bear on a corresponding stud at least when said electronic device is in said connection position;



an abutment device integral with said resiliently deformable portion and with said support portion, said abutment device being urged by the abutment element of the electronic device when its slides in said first guiding means in said insertion direction, so as to cause the support portion to be moved and the resiliently deformable portion to be deformed, the distance between said abutment device and each of said sliding contact members being substantially equal to the distance between the abutment element and one corresponding contact stud of the electronic device;

a plurality of conductor elements integral with said support portion and said resiliently deformable portion, each of said conductor elements connecting a contact holder to a corresponding fixed conductor;

detection means responsive to the movement of the electronic device along said first guiding means for detecting the presence of the electronic device in said connection position.

4,687,269

ELECTRIC CONTACT TERMINAL THERMO-INSERTABLE ONTO A PRINTED CIRCUIT CARD AND A CONNECTOR HAVING SUCH TERMINALS

Alain Dubertret, Sevres; Gilles Rizzo, Creteil; Raymond Bargain, Sartrouville; Michel De Mendez, Montlhery, and Jacky Thenaisie, Le Mans, all of France, assignors to Souriau & Cie, Boulgone Billancourt, France

Filed Mar. 13, 1986, Ser. No. 839,095

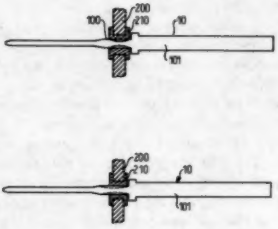
Claims priority, application France, Mar. 19, 1985, 85 04042; Oct. 28, 1985, 85 15973

Int. Cl.[4] H01R *13/20*

U.S. Cl. 439—161 **36 Claims**

1. In an electric connector thermo-insertable onto a printed circuit card provided with metallised apertures comprising a plurality of insertable male or female contact terminals combined together by at least one insulating support, the improvement wherein:

said contact terminals have at least one insertable part, of shape-memory material, said insertable part of each of said terminals being shaped, on the one hand, to final shape dimensions of use after insertion, corresponding to its stable shape-memory state, in a manner to ensure mechanical retention and electric contact with said aperture, and,



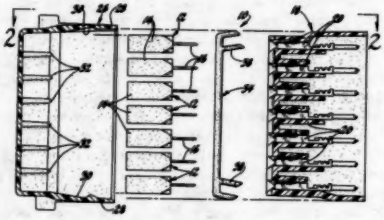
on the other hand, in a manner to occupy, under the influence of stresses exerted by said corresponding aperture a second non-memorised shape state at temperature lower than the transition temperature Ms of said material in a manner to be able to be introduced and/or withdrawn from said aperture.

4,687,270

FUSE PACKAGE

Robert G. Plyler, Vienna, and Jay H. Garretson, Warren, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 18, 1986, Ser. No. 886,646
Int. Cl.[4] H01R *13/68, 13/627*
U.S. Cl. 439—350 **3 Claims**



1. A fuse package for retaining and handling a plug-in type fuse, said package comprising,

an insulator block including a first locking means and an electrical terminal adapted to receive said plug-in fuse with a gripping force,

a cover adapted to be installed on and removed from said insulator block and also adapted to hold a plug-in type fuse with a holding force sufficient to maintain said fuse in the proper orientation to plug into said terminal as said cover is installed, but less than said gripping force so that said fuse remains with said terminal and block as said cover is removed,

a fuse retainer sized so as to be fitted within said cover with a retention force sufficient to prevent said fuse from falling out of said cover before installation, so that said fuse, retainer and cover may be handled and installed together as a unitary assembly, and

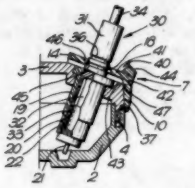
a second locking means on said retainer interengageable with said first locking means on said insulator block as said unitary assembly is installed with a locking force sufficient to lock said retainer to said block and thereby retain said cover to said block, said locking force being greater than said retention force whereby said retainer stays with said insulator block as said cover is removed, thereby allowing said fuse to remain with said block and be easily removed and replaced prior to reinstalling said cover.

4,687,271

INSTRUMENT PLUG LOCKING DEVICE

Istvan Szoboszlai, Veyrier du Lac, and Christian Roucher, La Balme de Sillingy, both of France, assignors to ITT Composants et Instruments, Bagneux (Hauts-de-Seine), France

Filed Sep. 17, 1986, Ser. No. 908,499
Claims priority, application France, Sep. 23, 1985, 85 14046
Int. Cl.[4] H01R *13/639*
U.S. Cl. 439—350 **9 Claims**



1. A locking device for releasably retaining an electrical connection plug in a housing having a socket adapted to receive said plug therein, comprising:

an elastic part adapted to be mounted on said housing;

said part embodying integral hinge means and a tab extending from said hinge means adapted to extend over said socket;

said tab having a hole therethrough adapted to overlap a portion of said socket;

the edge of said hole opposite to said hinge means adapted to cooperate with a plug to retain the plug in said socket; and

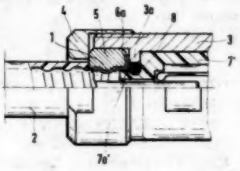
said hinge means being deformable to shift said tab laterally whereby said edge can be released from the plug.

4,687,272

DEVICE FOR PRESSURE SEALED CONNECTION OF THE OUTER CONDUCTOR OF A COAXIAL LINE

Georg Spinner, Am Eichberg 12/8152, Feldkirchen-Westerham; Franz-Xaver Pitschi, Risserkogelstrasse 2/8183, Rottach-Egern, and Horst Linnerbauer, Sudetenstrasse 1266/8206, Bruckmuehl, all of Fed. Rep. of Germany

Filed Jun. 25, 1986, Ser. No. 878,310
Claims priority, application Fed. Rep. of Germany, Jun. 25, 1985, 3522736
Int. Cl.[4] H01R *17/18*
U.S. Cl. 439—271 **6 Claims**



1. A device for pressure sealed connection of the outer conductor of a coaxial line to a connector or the like, comprising:

a screw cap forcing one end section of the outer conductor toward an annular contacting surface of a plug socket of the connector;

an intermediate element arranged between said screw cap and the outer conductor, said screw cap acting on said one end section via said intermediate element;

a support insulator surrounded by said plug socket; and

a sealing ring arranged between said support insulator and said plug socket within the HF-space in a plane defined by said contacting surface, said sealing ring being contacted by said one end section of the outer conductor along a ring area which is of a diameter smaller than the diameter of said annular contacting surface wherein said one end section of the outer conductor is radially flanged outwardly, said plug socket being provided with an inner collar whose inner circumference defines with said support insulator an axially open annular groove in which said sealing ring is accommodated.

4,687,273

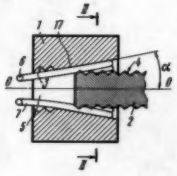
CONNECTOR FOR ELECTRICAL CONDUCTORS

Anatoly S. Pranch, Riga, U.S.S.R., assignor to Latviisky Gosudarstvenny Universitet Imeni Petra Stuchki, Riga, U.S.S.R.

Filed Apr. 26, 1985, Ser. No. 727,774

Int. Cl.[4] H01R *11/26*

U.S. Cl. 439—411 **1 Claim**



1. A connector for an electrical conductor, comprising two parts which are a threaded sleeve and a threaded rod, respectively, having interfacing threaded surfaces, and at least one longitudinally tapered recess for receiving the electrical conductor provided on the interfacing threaded surfaces of the rod, said recess having a surface extending inward at an acute angle to the longitudinal axis of the connector, with the depth of said recess increasing in one direction and decreasing in the opposite direction so that threading said parts together causes at least the threaded surfaces of the sleeve to engage and be pressed into the electrical conductor in the recess in the rod to form an electrical connection, and with the longitudinally tapered recess in the rod opening outward with respect to the rod along substantially the entire length of the recess.

4,687,274

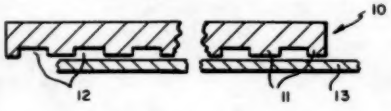
ELECTRICAL CONTACTS

Nam P. Suh, Sudbury; Nannaji Saka, and Ming J. Liou, both of Cambridge, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed May 10, 1984, Ser. No. 609,022

Int. Cl.[4] H01R *11/02*

U.S. Cl. 439—426 **14 Claims**



1. A pair of slidably contacting elements, a surface of at least one of said elements comprising a plurality of first contact portions and a plurality of second depressed portions, said contact portions forming island portions in between the valley portions formed by said depressed portions, said contact portions being in slidable contact with a contact surface of the other of said elements, the surfaces of said pair of elements which are in slidable contact being relatively moveable with respect to each other and the depressed portions of said at least one element entrapping substantially all of the wear particles generated at the contact regions between the contact portions of said at least one element and the contact surface of said other element during said relative movement by the movement of said wear particles from said contact regions into said depressed portions.

4,687,275

ELECTRICAL CONNECTOR FOR FLAT MULTICONDUCTOR CABLE

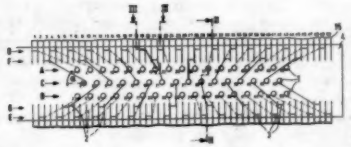
Hans Ramisch, Mühldorf, and Gerhard Neumann, Waldkraiburg, both of Fed. Rep. of Germany, assignors to Otto Dunkel GmbH Fabrik für elektrotechnische Geräte, Mühldorf, Fed. Rep. of Germany

Filed Nov. 27, 1985, Ser. No. 803,211

Claims priority, application Fed. Rep. of Germany, Nov. 27, 1984, 3443235

Int. Cl.[4] H01R *4/24*

U.S. Cl. 439—404 **14 Claims**



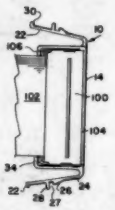
1. In an electrical connector for a flat multiconductor cable, wherein said electrical connector has at least three rows of connection contacts mounted at a defined distance from one another in an elongate body of insulating material, said connection contacts comprise sockets or pins which extend toward one, outer surface of said insulating body, said connection contacts are each connected, via a respective center connecting section, with a respective conductor terminal of the insulation displacement type which each have the shape of a pair of contact fingers extending approximately mutually parallel toward the opposite outer surface of said insulating body, and said conductor terminals are longitudinally spaced differently from one another than the associated connection contacts and are located such that each conductor of the flat cable can be pressed between a respective pair of said contact fingers and contacted by piercing the insulation surrounding the conductor; the improvement wherein: said conductor terminals associated with the connection contacts in the outer rows of conductor terminals and said conductor terminals associated with said connection contacts in the center row of connection contacts are arranged in respective rows which lie in planes other than the planes of the three rows of connection contacts; the two outermost rows of conductor terminals are at a greater distance from one another than the distance between the planes of said two outer rows of connection contacts; said center connecting sections for said conductor terminals and their associated said connection contacts are each formed by a contact tab which extends transversely to the longitudinal axis of the associated said connection contact; and, in each row of connection contacts, each said contact tab forms an angle with the longitudinal axis of said one surface of said insulating body, with said angle, starting at the center of said insulating body surface, decreasing toward each of the two ends of said insulating body.

4,687,276

CONNECTOR CLIP FOR RIBBON CABLE CONNECTOR

Edward F. Stockmaster, Mentor, Ohio, assignor to The Babcock & Wilcox Company, New Orleans, La.

Filed Sep. 5, 1986, Ser. No. 904,739
Int. Cl.[4] H02B *1/02*
U.S. Cl. 439—557 **14 Claims**



1. A connector clip for a ribbon cable connector comprising a side wall,

a pair of end walls connected to opposite ends of said side wall;

a front lip connected to said side wall and to said end walls and extending between said end walls, said side wall, end walls and front lip forming a receptacle having an open front and an open side opposite from said side wall,

a directional snap tab extending from each end wall to said receptacle and near a side of each end wall opposite from said side wall; and

a resilient spring tab connected to an outer surface of each end wall near said front lip, each spring tab extending at an angle outwardly from its respective end wall in a direction away from said front lip, each spring tab carrying a panel slot on an outer surface thereof:

whereby a cable connector is insertable, without the aid of any tools, into said receptacle behind said front lip, said snap tabs being engaged against the connector for retaining the connector in said receptacle, said spring tabs being resiliently movable toward each other for receiving edges of a panel opening in said panel slots to hold said clip to a panel having panel openings.

4,687,277

ARRANGEMENT FOR CONNECTING AN ELECTRIC DEVICE WITH A MOUNTING THEREFOR

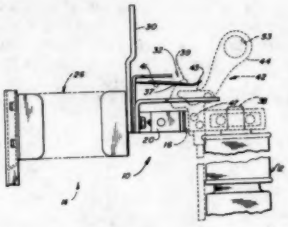
Bruce A. Biller, Chicago, Ill., assignor to S&C Electric Company, Chicago, Ill.

Continuation of Ser. No. 726,863, Apr. 25, 1985, abandoned. This application Sep. 16, 1986, Ser. No. 910,274
Int. Cl.[4] H01R *13/645*
U.S. Cl. 439—621 **13 Claims**

1. An improved connection arrangement of the type including an electrical device and a mounting, the mounting including stationary electrical connections, the electrical device including protruding electrical connection members having predetermined dimensions, distinct types of electrical devices being characterized by the electrical connection members having different predetermined dimensions, wherein the improvement comprises:

connection means including at least one conductive contact element and having predetermined structural features that cooperate with respective electrical connection members for affixing each of said contact elements to a respective electrical connection member and for preventing the assembly of each of said contact elements to electrical connection members other than those corresponding to the appropriate predetermined electrical devices, said connection means comprising means for clamping each of said contact elements to a respective electrical connection member, said clamping means comprising at least one clamp member, the electrical connection member being interposed between said at least one clamp member and said contact element, electrical connection members other than those that are appropriate for each of said contact elements interfering with clamping of said contact element with said at least one clamp member, said contact elements being dimensioned to interfit with the stationary electrical connections of the mounting; and

cooperating means for preventing insertion of an electrical device into a mounting other than a predetermined, appropriate mounting for the electrical device, wherein said cooperating means comprises one or more extending members arranged in a predetermined manner with respect to said connection means, and means carried by the mounting for providing appropriate clearance to said one or more extending members and for blocking said extending members other than those corresponding to the predetermined, appropriate mounting.

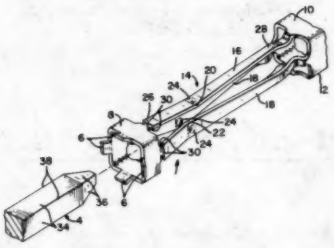


4,687,278

CONTACT SOCKET WITH IMPROVED CONTACT FORCE

Dimitry Grabbe, Middletown, and Iosif Korsunsky, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jul. 31, 1986, Ser. No. 891,709
Int. Cl.[4] H01R *13/11*
U.S. Cl. 439—842 **6 Claims**



1. A contact socket for receiving a contact pin, the contact socket comprising:

a pin receiving end and an inner end, the inside dimensions of the ends being greater than the dimensions of the pin;

an intermediate portion between the pin receiving end and the inner end having an even number of at least two simi-

lar beams which are integrally attached to the pin receiving end as well as the inner end, the beams being equally spaced around the axis of the socket;

each of the beams projecting inward toward the axis of the socket such that a contact section is provided at an apex of the beam which nearest the axis of the socket;

an embossment positioned on the apex of each beam, the embossment projecting inwardly towards the axis of the socket, the embossments on each pair of opposed beams being aligned with respect to the axis of the socket, the minimum distance between the surfaces of the embossments being less than the diameter of the contact pin;

the associated pairs of beams having their embossments spaced from the pin receiving end; and

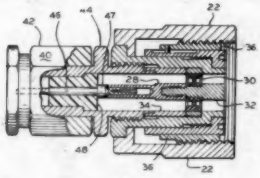
each of the beams having recesses provided proximate the pin receiving end to allow the outer end of the beam to operate as a pivot point, and each of the beams being tapered from proximate the contact section to the inner end, the recesses and tapering allowing the beams to be more resilient, preventing the beams from taking a permanent set when the pin is inserted at an improper angle of insertion.

4,687,279

HIGH FREQUENCY COAXIAL CONNECTOR ADAPTOR

Brian J. Holland, Woodridge, and Mark P. Kotilinek, Lombard, both of Ill., assignors to Storm Products Co., Hinsdale, Ill.

Filed Dec. 20, 1985, Ser. No. 811,495
Int. Cl.[4] H01R *17/18*
U.S. Cl. 439—578 **8 Claims**



1. A high frequency coaxial connector adaptor having a first conductive body with a central bore defining an annular shoulder adjacent a first end thereof and terminating in a contact face at the first end adapted to be placed in contact with a mating face of another connector, the adaptor further having an insulating disc having an annular outer conductive contact and an annular inner conductive contact separated by a dielectric, and being slidably positioned within the central bore of the body and adpated to abut the annular shoulder of said body in conductive contact therewith, and the adaptor further having a central cylindrical conductor having external threads at one end, an annular radial shoulder intermediate its ends, and having a central axial recess at its end opposite the threaded end adapted to receive in said recess a plurality of circumferentially arranged spring fingers, the central cylindrical conductor being adapted to be axially positioned within the annular inner conductive contact of the insulating disc with the annular radial shoulder of the central conductor abutting the disc, the adaptor further comprising:

an annular conductive sleeve adapted to be positioned within the central bore of the tubular conductive body of the adaptor in conductive contact therewith, said sleeve having an internal annular radial shoulder at one end and being adapted at the other end to abut the annular outer conductive contact of said insulating disc;

a cylindrical conductive member having recesses at least at its ends and coaxially positionable at least partially within said sleeve, said member having internal threads at one end portion adapted to threadingly and conductively engage the external threads of the said one end of the central conductor of the adaptor, and the opposite end of the said member being adapted to receive a selected one of a plurality of coaxial connector interfaces having an inner conductor with spring fingers adapted to engage the cylindrical conductive member,

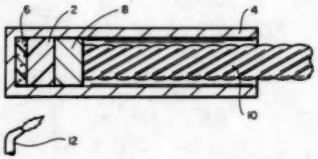
whereby said annular conductive sleeve provides a contact surface at the internal annular shoulder end for conductively engaging an outer contact of the selected coaxial connector interface to provide a conductive path through the first conductive body, and said cylindrical conductive member provides an integral conductive path with the central cylindrical conductor and the inner conductor for transferring a high frequency signal substantially without distortion.

4,687,280

HEAT ACTIVATABLE SEALING PISTON

Lester T. Toy, Fremont, and Daniel Magay, Los Altos, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 604,791, Apr. 27, 1984, abandoned. This application Apr. 16, 1985, Ser. No. 723,699
Int. Cl.[4] H01R *4/02*
U.S. Cl. 439—874 **13 Claims**



1. A method of producing a sealing piston within a hollow, relatively rigid tubular article which comprises:

(a) forming a cylinder of polymeric material, said cylinder having a diameter to length ratio less than 4.5:1;

(b) placing said cylinder within a tubular article which has an internal diameter greater than the diameter of the cylinder by an amount of up to about 300%;

(c) heating to effect radial expansion of the cylinder causing it to exert a pressure on the walls of said tubular article thereby forming a seal between the cylinder and the walls of the tubular article;

(d) exerting an axial pressure on said cylinder causing it to move axially within the tubular article while maintaining the seal between the cylinder and the walls of the tubular article.

4,687,281

SYNTHETIC APERTURE LASER RADAR

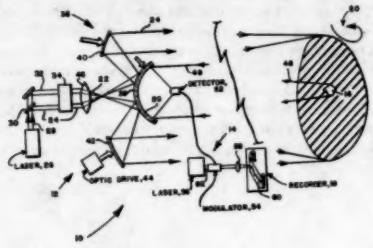
Richard A. Gross, Reseda, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 22, 1985, Ser. No. 736,898
Int. Cl.[4] G03H *1/08*; G01B *9/021*
U.S. Cl. 350—3.66 **5 Claims**

1. A synthetic aperture laser radar, said laser radar being positioned by a tracking radar, said laser radar comprising:

a laser transmitter, said laser transmitter outputting a reference beam and a phase shifted beam having a changing phase shift delay with respect to said reference beam, said beams overlapping and forming a moving fringe pattern

within a given area containing an object to be examined, said object reflecting a return beam, and



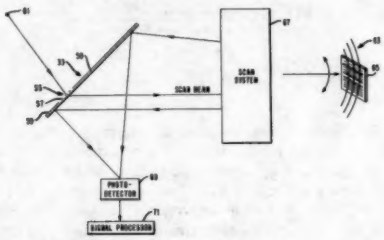
a receiver, said receiver forming a holographic picture of said object from said return beam.

4,687,282

METHOD AND APPARATUS FOR MAKING AND UTILIZING A HOLOGRAPHIC BIFOCAL LENS ELEMENT

Ronald A. Ferrante, Senecaville, Ohio, assignor to NCR Corporation, Dayton, Ohio

Filed Apr. 25, 1985, Ser. No. 727,309
Int. Cl.[4] G02B *5/32*
U.S. Cl. 350—3.7 **27 Claims**



1. An apparatus for scanning a bar code label comprising:

a source of coherent radiant energy beam, said source having an operating frequency;

a holographic bifocal disc member positioned adjacent the said source including a first holographic lens located at the center of said disk and receiving the coherent radiant energy beam for generating and transmitting a first reconstructed beam of radiant energy along a first path;

said disc member further including a second holographic lens surrounding said first holographic lens in a non-overlapping relationship, said second holographic lens substantially filtering out all frequencies of radiant energy incident thereon except for a relatively narrow spectral bandpass centered around the operating frequency of said source;

scanning means mounted in said first path for directing said first reconstructed beam in a scanning patterh at a bar code label positioned in a preselected region, said bar code label reflecting the scanning beam back towards said scanning means which directs the reflected scanning beam toward said second holographic lens;

said second holographic lens being responsive to the scanning beam reflected from the bar code label for generating and focusing a second reconstructed beam of radiant energy at a collection point; and

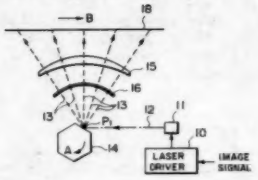
means positioned at the collection point for extracting desired information from said second reconstructed beam.

4,687,283

SCANNING OPTICAL SYSTEM

Michio Ito, Hachioji; Yukimasa Shinohara, Funabashi, and Nobuhiro Imai, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 23, 1983, Ser. No. 525,714
Claims priority, application Japan, Aug. 30, 1982, 57-150512
Int. Cl.[4] G02B *26/08*; G01D *9/42*
U.S. Cl. 350—6.8 **9 Claims**



1. A scanning optical system in a laser beam printer comprising:

modulated beam forming means for forming a laser beam modulated correspondingly to an electrical signal to be recorded;

rotatable deflecting means for deflecting said laser beam to scan a photosensitive surface;

filter means disposed in the optical path between said rotatable deflecting means and said photosensitive surface and scanned by said laser beam, said filter means having a substantially concave surface facing said rotatable deflecting means; and

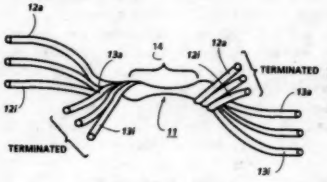
a lens for imaging said laser beam on said photosensitive surface, said lens being disposed in the optical path between said photosensitive surface and said rotatable deflecting means, the laser beam passing through said filter means and said lens scanning said photosensitive surface in a predetermined direction.

4,687,284

BRIGHT FIBER-FREE BICONICALLY TAPERED COUPLERS

Eric G. Rawson, Saratoga, and Lawrence C. Stewart, Palo Alto, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Sep. 4, 1984, Ser. No. 646,548
Int. Cl.[4] G02B *6/28*
U.S. Cl. 350—96.16 **3 Claims**



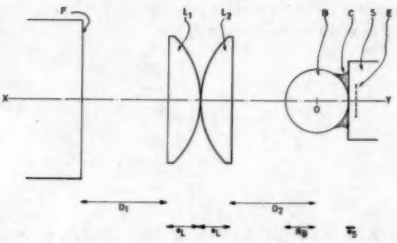
1. A biconically tapered passive star optical coupler comprising first and second mutually exclusive sets of optical fibers configured to form an axially extending biconical taper; the fibers of said first and second sets being coaxially twisted about one another, being optically united throughout said biconical taper, and being terminated internally of said coupler adjacent opposite sides of said taper; whereby light injected into any of the fibers of one of said sets is gradually transformed into and generally uniformly distributed among all of the fibers of the other of said sets.

4,687,285

DEVICE FOR COUPLING A LIGHT SOURCE AND AN OPTICAL WAVEGUIDE

Claude E. Hily, Ozouer-le-Voulgis, and Jacqueline-Madeleine Michel, Yerres, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 2, 1985, Ser. No. 783,294
Claims priority, application France, Oct. 5, 1984, 84 15311
Int. Cl.[4] G02B 6/32
U.S. Cl. 350—96.18 19 Claims



1. A device for coupling a light source and an optical waveguide, said waveguide having an input face, said device comprising:

a light source having an emissive surface with a size less than or equal to that of the input face of the optical waveguide;

a ball lens arranged in contact with the light source, said ball lens having a center; and

a convergent optical system arranged between the ball lens and the input face of the waveguide, said optical system forming an image of the input face with a magnification of approximately −1 in the center of the ball lens;

characterized in that:

the ball lens and the optical system has a focal point; and

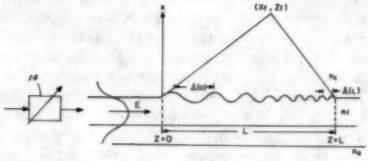
the emissive surface of the light source is arranged at the focal point of the ball lens and the optical system so that rays emitted from any point on the emissive surface enter the waveguide as a parallel beam.

4,687,286

METHODS OF AND APPARATUS FOR OPTICAL SPATIAL SCANNING

Herbert G. Winful, Bedford, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed May 3, 1985, Ser. No. 730,215
Int. Cl.[4] G02B 6/34
U.S. Cl. 350—96.19 10 Claims



1. A light controlled spatial scanner comprising

a corrugated waveguide fabricated of a material having a nonlinear index coefficient of refraction n_2, said waveguide having corrugations with a period that varies linearly from Λ (0) at one point to Λ (L) at another point, where Λ (0) is greater than Λ (L);

means for applying guided modes of light within said waveguide in a direction from said one point to said another point, wherein said corrugations couple light from said guided modes to radiation modes focused at a focal spot in space; and

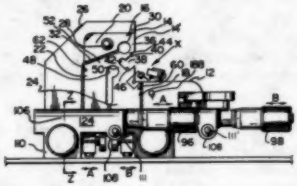
means for varying intensity of said light within said waveguide to cause said focal spot to traverse a path without said waveguide dependent upon the varied intensity.

4,687,287

APPARATUS FOR ALIGNING AN ARTICLE RELATIVE TO A DATUM

Helmut H. Lukas, Carleton Place, and Grant K. Pacey, Kanata, both of Canada, assignors to Bell-Northern Research Ltd., Ontario, Canada

Filed Dec. 8, 1983, Ser. No. 559,447
Int. Cl.[4] G02B 6/36; B25B 1/06
U.S. Cl. 350—96.20 23 Claims



22. Apparatus for aligning at least one filamentary article relative to a datum comprising:

a Vee groove for receiving said filamentary article in the apex thereof and;

gripping means for clamping said filamentary article into said apex;

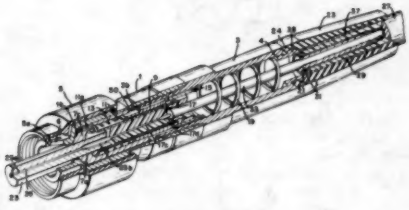
wherein said gripping means comprises a thimble-shaped tappet member for contacting said filamentary article over a significant part of its length and at a position disposed away from said apex, and biassing means for urging said tappet member towards said apex, said tappet member being arranged with its external end surface disposed towards said apex and movable towards and away from said apex against the action of said biassing means, and said biassing means being arranged to cooperate with the internal end surface of said thimble member.

4,687,288

FIBER OPTIC CONNECTOR WITH TEMPERATURE COMPENSATING MECHANISM

Mark Margolin, Lincolnwood; James E. Moore, Wheaton, and Igor Grois, Lincolnwood, all of Ill., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Continuation-in-part of Ser. No. 757,097, Jul. 19, 1985. This application Aug. 16, 1985, Ser. No. 766,743
Int. Cl.[4] G02B 6/38
U.S. Cl. 350—96.20 18 Claims



1. A fiber optic cable connector, comprising:

a body having two ends, one end being a fiber mating end;

cable connection means for connecting a fiber optic cable of the type having a fiber extending through the center thereof with the fiber surrounded by a buffer layer to said body at one end thereof in a manner such that a portion of the cable having the fiber surrounded by the buffer layer

and a portion of the cable having the fiber stripped of its buffer layer extends into said body;

fiber retention means for holding the buffer layer covered fiber at a terminated portion of the buffer layer wherefrom the fiber extends, and for holding the bare fiber extending from the terminated buffer layer in a fixed relationship with respect to said fiber retention means, and within said body;

capillary ferrule means for receiving said portion of said bare fiber therein in a manner such that said bare fiber is slidable within said capillary ferrule means and further including capillary retaining means for holding said capillary ferrule means in fixed relationship with respect thereto and in a manner extending from the other end of said body and such that said capillary retaining means is retained within said body;

spring means for urging said capillary retaining means toward said other end of said body and for permitting said capillary ferrule means to retract into said body upon a force being applied thereto when said connector is connected to a like connector; and

temperature compensating means for permitting termination of said fiber in a manner such that it is urged outwardly from the end of said capillary ferrule means when said connector is assembled, and when said connector is connected to a like connector for maintaining the end of the fiber flush with the end of said capillary ferrule means, whereby physical contact between the ends of two bare fibers is obtained by connecting said connector to another like connector and maintained under varying temperature and alignment conditions, and said compensating means comprising a compensating sleeve member having a predetermined coefficient of expansion and positioned in a manner such as to exert a force along the longitudinal axis of said bare fiber, as a result of expansion of said sleeve member due to temperature changes, said force being sufficient to ensure that said bare fiber slides within said capillary ferrule means, when said capillary ferrule means also expands due to temperature changes, with said sliding being an amount sufficient to cause the end of said bare fiber to be maintained flush with the end of said capillary ferrule means.

4,687,289

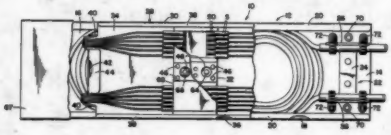
FIBEROPTIC SPLICE ORGANIZER

Raymond J. DeSanti, Worcester, Mass., assignor to BRIntec Corporation, Willimantic, Conn.

Filed Sep. 17, 1985, Ser. No. 776,799

Int. Cl.[4] G02B *6/36*

U.S. Cl. 350—96.20 **16 Claims**



1. A fiberoptic splice organizer comprising an elongated main body formed from flat metal and having a generally rectangular bottom wall and a pair of opposing parallel side walls bent upwardly from said bottom wall, said side walls having upper marginal edges turned inwardly toward each other to form spaced apart lips at the upper end of said body lying within a common plane parallel to said bottom wall, said main body defining an upwardly open channel extending longitudinally therethrough, a pair of strain relief members mounted in fixed position on said bottom wall near opposite ends of said channel, a fiber tray assembly including a shallow fiber tray and a splice holder mounted in fixed position within said fiber tray, said fiber tray having a width substantially equal to the width of said main body and supported on said lips above said channel and forming a closure for an associated upper portion of said channel, said splice holder including a rectangular block of material having longitudinally extending and upwardly opening splice receiving grooves therein and means for releasably retaining fiberoptic splices within said grooves including a splice holder cover supported on said splice holder in substantially covering relation to said grooves, means defining a protective cover overlying said one fiber tray assembly and forming a closure for said fiber tray, and clamping means associated with said main body for releasably securing said fiber tray assembly to said body, said splice holder cover to said splice holder and protective cover in overlying relation to said fiber tray assembly.

4,687,290

PROTECTIVE TUBE ARRANGEMENT FOR A GLASS FIBER

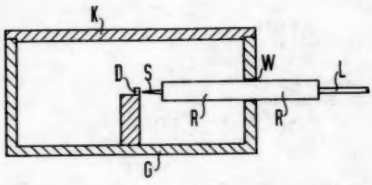
Herbert Prussas, Reichertshausen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Feb. 15, 1985, Ser. No. 701,974

Claims priority, application Fed. Rep. of Germany, Feb. 17, 1984, 3405805

Int. Cl.[4] G02B *7/26, 7/00*

U.S. Cl. 350—96.20 **11 Claims**



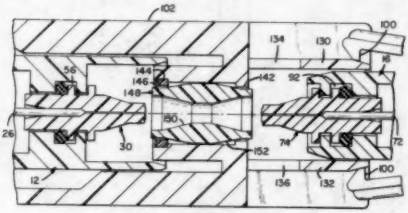
1. In a protective tube arrangement for a glass fiber, said tube arrangement being particularly useful for mounting in a housing of a module, said tube arrangement including a glass fiber having a taper at one end and being positioned in a stiff protective tube with the tube surrounding and protecting the glass fiber and holding it in alignment with the taper extending from one end of the tube, and the module having an operating temperature and a storage temperature which have a maximum temperature limit and a minimum temperature limit, the improvements comprising stiff first means for securing the fiber in the proximity of the taper to the tube at a first location and second means for securing the fiber to the tube at a second location spaced from the first location with the fiber being free of any means for securing between the first and second locations, said locations on the tube and on the glass fiber being selected with the length of the fiber between the first and second locations being greater than the distance of the tube between the locations at any temperature below the maximum temperature limit so that the fiber is substantially free of tensile stresses and said length and distance are selected so that at a temperature below the maximum temperature limit and above the minimum temperature limit, the glass fiber hangs loosely in the tube between the two locations and the only stresses on the fiber are axially directed compressive stresses of below 1 N/mm^2 so that no triggering of creep even over a long period of time will occur to cause misalignment and damage.

4,687,291

DUPLEX ELECTRO-FIBER CONNECTOR ASSEMBLY

William J. Stape, Lewisberry, and Robert N. Weber, Hummelstown, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jun. 8, 1984, Ser. No. 618,851
Int. Cl.[4] G02B 6/38
U.S. Cl. 350—96.21 **15 Claims**



12. In a fiber optic connector assemby, wherein optical fibers of optical cables are surrounded by corresponding ferrules, the corresponding ferrules are mounted to connectors, the connectors removeably connect to an interconnect member, and each pair of the corresponding ferrules is aligned by the connectors with a corresponding receptor, the improvement comprising;

each said corresponding receptor has open ends and aligns ends of the corresponding ferrules inserted into the open ends,

each said corresponding receptor is held pivotally by the interconnect member, and

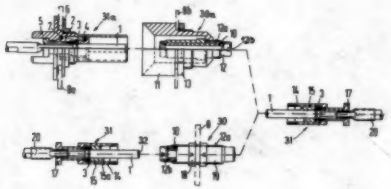
each said corresponding receptor has an exterior surface providing a pivot engaged against a portionn of the interconnect member and pivotally mounting said each said corresponding receptor with respect to the interconnect member.

4,687,292

LIGHT WAVEGUIDE PLUG CONNECTOR

Peter Krausse, Aschheim, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Apr. 16, 1985, Ser. No. 723,814
Claims priority, application Fed. Rep. of Germany, Apr. 18, 1984, 3414735
Int. Cl.[4] G02B 6/38
U.S. Cl. 350—96.21 **11 Claims**



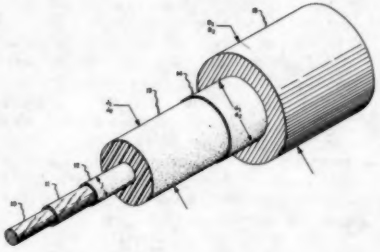
1. In a light waveguide plug connector having a plug sleeve with opposite ends for receiving metal plug pins, each of said plug pins having a pin with an outer surface and a capillary bore receiving a light waveguide fiber with an end of the fiber being flush with an end of the pin, said plug sleeve being composed of a rigid, hard metal bushing having a bore with an inside surface precisely matched to the outer surface of each of the two pins so that when the two plug pins are inserted into the opposite ends of the plug sleeve the fibers are axially aligned in an abutting relationship in the plug sleeve, the improvements comprising the plug sleeve having securing means for fastening the plug sleeve to a wall of a supporting structure, said securing means including an outer sleeve member surrounding the bushing to provide means for protecting the plug pins and for transferring the forces between the plug sleeve and the plug pins, and each of the plug pins having means for aiding in the connection of the plug pins to the plug sleeve.

4,687,293

METAL-ENCASED LIGHT CONDUCTOR

Matthew J. Randazzo, Tonawanda, N.Y., assignor to Conax Buffalo Corporation, Buffalo, N.Y.

Filed Dec. 27, 1985, Ser. No. 813,789
Int. Cl.[4] G02B 6/44
U.S. Cl. 350—96.23 **5 Claims**



1. A metal-encased light conductor having a continuous pressure boundary seal capable for use in an environment having a pressure up to about 5000 pounds per square inch based on a sealing length of a minimum of 6 inches and a temperature falling in the range of from about −40° C. to about 250° C., comprising:

an optical fiber including a core surrounded by a cladding,

a buffer coating said cladding composed of a polyimide,

a uniform jacket surrounding said buffer composed of thermoplastic material having a melting point above 200° C.,

an epoxy film on said jacket cured at a temperature of at least 100° C., and

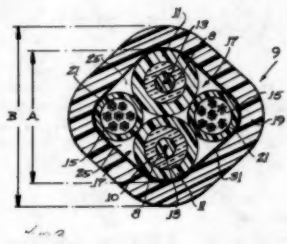
a mechanically reduced ductile metal sheath surrounding said film and compressing said jacket.

4,687,294

FIBER OPTIC PLENUM CABLE

Purita R. Angeles, Aurora, Ill., assignor to Cooper Industries, Inc., Houston, Tex.

Filed May 25, 1984, Ser. No. 614,544
Int. Cl.[4] G02B 6/44; H01B 7/00
U.S. Cl. 350—96.23 **11 Claims**



1. A fiber optic cable comprising

a plurality of optical fibers,

a buffer layer of elastomeric material surrounding and in intimate contact with each of said optical fibers to protect

the fiber from radial stresses over a predetermined temperature range,

a serving of nonburning material around each of said buffer layers,

a jacket of relatively rigid polymeric material which has low smoke-producing, low flame-spreading properties surrounding said serving,

a plurality of strength members of rigid, nonburning material for increasing the strength and rigidity of the cable and formed of material having a coefficient of thermal expansion of between about 0.2×10^{-6} and about 15×10^{-6}cm/cm/°C., said strength members controlling the thermal expansion characteristics of said cable, each strength member being surrounded by a jacket of relatively rigid polymeric material which has low smoke-producing, low flame-spreading properties, and

an outer tube of low smoke-producing, low flame-spreading material bundling said jacketed optical fibers and said jacketed strength members, compressing the same against each other so that each jacketed optical fiber engages at least two jacketed strength members, whereby said strength members act to thermally stabilize said optical fibers,

said cable having a flame-spread of 1.52 meters or less, a maximum optical density of 0.5 or less and an average optical density of 0.15 or less as measured in the UL 910 Steiner Tunnel smoke and flame test.

4,687,295

OPTICAL FIBER HAVING POLYMETHACRYLATE CORE AND FLUORO-COPOLYMER CLADDING

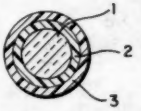
Toshio Koishi, Sakado; Isao Tanaka, Kawagoe; Takashi Yasumura, Fujimi, and Yukitoshi Nishikawa, Shiki, all of Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed Jul. 11, 1985, Ser. No. 753,986

Claims priority, application Japan, Jul. 11, 1984, 59-142195

Int. Cl.⁴ G02B *6/00*

U.S. Cl. 350—96.34 **6 Claims**



1. An optical fiber comprising:

a solid cylindrical core formed of a polymer at least a major constituent of which is methyl methacrylate; and

a cladding layer which is in close contact with the core and is formed of a copolymer of vinylidene fluoride with hexafluoroacetone.

4,687,296

OPTICAL PICKUP

Yasunori Terayama, Chiba; Masashi Nakamura, Tokyo; Kazuhiko Fujiie, Tokyo, and You Yoshitoshi, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

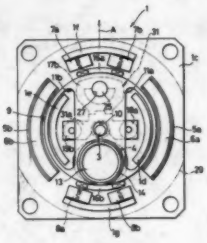
Filed Aug. 22, 1985, Ser. No. 768,056

Claims priority, application Japan, Sep. 28, 1984, 59-146806[U]

Int. Cl.⁴ G02B *7/04*; F16C *25/06*

U.S. Cl. 350—247 **5 Claims**

1. An optical pickup comprising an objective lens holder, an objective lens received within said holder, a base, a support shaft secured to said base and supporting said objective lens holder such that said objective lens holder is slidable along an axial direction and pivotable about an axis thereof, a press member composed of an elastic material interposed between said objective lens holder and said base, said press member being compressed between said objective lens holder and said



base such that said objective lens holder is urged in a direction perpendicular to said support shaft.

4,687,297

LENS MOUNTING MECHANISM

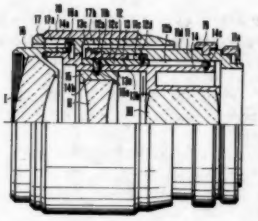
Shigeru Kamata, Tokyo, and Toshimi Iizuka, Kanagawa, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 31, 1985, Ser. No. 740,204

Claims priority, application Japan, Jun. 14, 1984, 59-88802[U]

Int. Cl.⁴ G02B *7/02, 15/14*

U.S. Cl. 350—252 **3 Claims**



1. A lens mounting comprising:

(a) a body tube;

(b) a holder containing a focusing lens member or a zoom lens member;

(c) an axially movable sleeve;

(d) an intermediate sleeve fitted between said body tube and said movable sleeve;

(e) means for moving said holder,

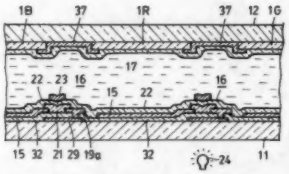
said means comprising guide slots formed respectively in said movable sleeve and said intermediate sleeve in crossing relation to each other, and a radial pin provided on said holder and engaging in both of said slots at a cross point thereof; and

(f) an adjusting ring fitted between said body tube and said intermediate sleeve, said adjusting ring being rotatable relative to said body tube and being restrained from axial movement relative thereto, and said adjusting ring and said intermediate sleeve being arranged upon rotation of said adjusting ring to axially move said intermediate sleeve.

4,687,298
FORMING AN OPAQUE METAL LAYER IN A LIQUID CRYSTAL DISPLAY

Shigeo Aoki, Habikino; Yasuhiro Ugai, Yao; Katsumi Miyake, Nara, and Kotaro Okamoto, Hino, all of Japan, assignors to Hosiden Electronics, Ltd., Osaka, Japan

PCT No. PCT/JP85/00185, § 371 Date Dec. 4, 1985, § 102(e) Date Dec. 4, 1985, PCT Pub. No. WO85/04732, PCT Pub. Date Oct. 24, 1985
PCT Filed Apr. 10, 1985, Ser. No. 812,890
Claims priority, application Japan, Apr. 11, 1984, 59-73656
Int. Cl.⁴ H01L *29/78*; G02F *1/13*
U.S. Cl. 350—334 12 Claims



1. A liquid crystal display device comprising first and second transparent substrates closely spaced apart and facing each other, a liquid crystal sealed between said transparent substrates, a plurality of transparent display electrodes provided on the inner surface of said first transparent substrate, thin film transistors formed on said first transparent substrates and each having a drain connected to each said display electrode, and a transparent common electrode formed substantially on the entire inner surface of said second transparent substrate,

said thin film transistors each including a semiconductor layer formed between corresponding display electrode and source electrode, a gate insulating film formed on said semiconductor layer on the side opposite said first transparent substrate, and a gate electrode formed on said gate insulating film,

an opaque metal layer being formed between each said thin film transistor and said first transparent substrate with an insulating layer provided between the thin film transistor and the opaque metal layer,

source buses of the same material as said opaque metal layer being formed integrally therewith on the side of said first transparent substrate to face said source electrodes thru said insulating layer, said source buses being connected to said source electrodes through holes formed in said insulating layer.

4,687,299
ELECTRODE STRUCTURE OF DOT-MATRIX LIQUID-CRYSTAL CELL HAVING CORRESPONDING NOTCHES AND SLITS

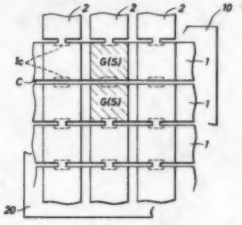
Osamu Yamada, Tokorozwa, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Jun. 16, 1986, Ser. No. 874,722
Claims priority, application Japan, Jun. 18, 1985, 60-132573
Int. Cl.⁴ G02F *1/13*
U.S. Cl. 350—336 5 Claims

1. An electrode structure of a liquid-crystal cell in which a plurality of transparent stripe signal electrodes are arranged on a first transparent substrate to be separated from each other at the central portions in the longitudinal direction thereof, a plurality of transparent stripe scanning electrodes are arranged on a second transparent substrate to be substantially perpendicular to said transparent signal electrodes, and a liquid-crystal material is sandwiched between said first and second transparent substrates,

wherein slits are formed in said transparent signal electrodes along the widthwise direction thereof at non-intersecting portions between said transparent signal electrodes and said transparent scanning electrodes, and

wherein a plurality of notches are formed along the two side

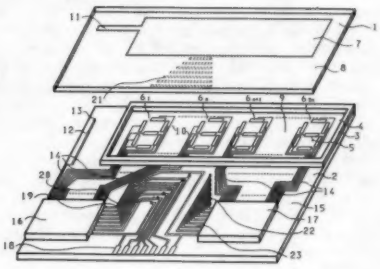


edges of each of said transparent scanning electrodes at equal intervals, and said notches correspond to electrode connecting portions adjacent to said slits of said transparent signal electrodes.

4,687,300
LIQUID CRYSTAL DISPLAY DEVICE

Kiichirou Kubo, and Mikio Kanazaki, both of Mobara, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 6, 1985, Ser. No. 795,454
Claims priority, application Japan, Nov. 9, 1984, 59-234901; Jan. 28, 1985, 60-12382
Int. Cl.⁴ G02F *1/133*
U.S. Cl. 350—336 5 Claims

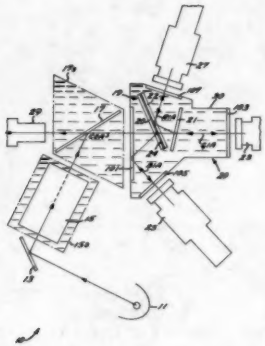


1. A liquid crystal display device comprising: first and second substrates coated on the inner surfaces thereof with electrodes, at least one of said first and second substates including an extended portion thereof which projects beyond the edge of the other of said substrates, a sealing member disposed around the periphery enclosing liquid crystal material and sealing between substrates, input conductors disposed on the inner surface of said extended portion and electrically connected to said electrodes, a plurality of driving integrated circuit chips mounted on the inner surface of said extended portion and eletrically connected to said input conductors, including a plurality of pairs of input terminals thereof electrically connected, one input terminal constituting each pair is arranged in the reverse order on one side of a reference line with respect to the other constituting the pair on the other side of a reference line, metal film conductors formed on the inner surface of said extended portion and connecting said corresponding input terminals of said adjacent chips, a plurality of external contact terminals to an external apparatus, formed on the inner surface of said extended portion and elecrically connected to input terminals of said chip.

4,687,301
FULL-COLOR PROJECTOR SYSTEM WITH A TRICOLOR-SEPARATING PRISM

Arno G. Ledebuhr, Fullerton, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jul. 12, 1985, Ser. No. 754,802
Int. Cl.[4] G02F *1/13*; G02B *5/30, 27/18*; H04N *9/31*
U.S. Cl. 350—401 **24 Claims**



1. A projector comprising:

first color separating means responsive to unmodulated polarized light for reflecting light of a first primary color and for transmitting the remaining portions of the incident unmodulated polarized light, said first color separating means further for internally reflecting incident light;

optical means for transmitting incident unmodulated polarized light to said first color separating means, and for internally reflecting said light of said first primary color as first primary color incident light;

second color separating means responsive to the light transmitted by said first color separating means for reflecting light of a second primary as second primary color incident light and for transmitting the remaining portion of the incident light which includes a third primary color incident light, said second color separating means reflecting said light of said second primary color to said first color separating means which internally reflects said second primary color light as second primary color incident light;

index matching optical fluid for optically coupling said first color separating means, said optical means, and said second color separating means; and

modulating means responsive to said first primary color incident light, said second primary color incident light, and said third primary color incident light.

4,687,302
ZOOM LENS

Keiji Ikemori; Tsunefumi Tanaka, both of Kanagawa, and Masatake Kato, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

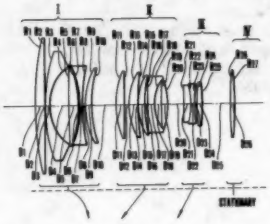
Continuation of Ser. No. 613,583, May 23, 1984, abandoned. This application Sep. 4, 1986, Ser. No. 903,901
Claims priority, application Japan, Jun. 1, 1983, 58-97178; Jul. 29, 1983, 58-140002
Int. Cl.[4] G02B *15/14*
U.S. Cl. 350—427 **11 Claims**

1. A zoom lens comprising:

from front to rear, a negative first component, a positive second component, a negative third component and a positive fourth component,

said first, said second and said third components being moved axially independent of each other when zooming, and said fourth component remaining stationary during zooming and wherein said first and said second components are closest to each other when in the telephoto positions, and said third and said fourth components are closest to each other when in the wide angle positions and also satisfying the following conditions:

$$1<f4/fT<8$$



$$0.5<|f1|/fT<1.2$$

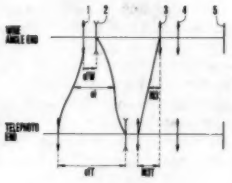
$$f2<|f1|<|f3|$$

wherein f1, f2, f3 and f4 are the focal lengths of said first, second, third and fourth components respectively, and fT is the longest focal length of the entire system.

4,687,303
ZOOM LENS SYSTEM

Sadatoshi Takahashi; Masatake Kato, both of Tokyo, and Sadahiko Tsuji, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 6, 1984, Ser. No. 628,447
Claims priority, application Japan, Jul. 14, 1983, 58-128554
Int. Cl.[4] G02B *15/16*
U.S. Cl. 350—427 **4 Claims**



1. A zoom lens system comprising:

from front to rear, a positive first lens component, a negative second lens component, a positive third lens component and a fourth lens component,

said first, second and third lens components moving when zooming, said first and second lens components moving non-linearly relative to the movement of said third lens component, and said fourth lens component remaining stationary during zooming,

said first and third lens components lying more to the front when in the telephoto end than when in the wide angle end, and said second lens component lying more to the rear when in the telephoto end than when in the wide angle end, and

the following condition being satisfied throughout the entire zooming range

$$\delta^2 e1/\delta M3^2=0$$

where e1is the separation between said first and second lens components, and M3 is the distance said third compo-

nent moves from the wide angle end as zooming progresses, with the rear-to-front movement being taken as positive.

4,687,304

INCIDENT ILLUMINATION APPARATUS FOR A MICROSCOPE

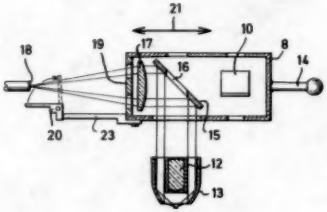
Horst Piller, and Albert Schilling, both of Aalen, Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim, Fed. Rep. of Germany

Filed Nov. 19, 1985, Ser. No. 799,648

Claims priority, application Fed. Rep. of Germany, Nov. 19, 1984, 3442218

Int. Cl.[4] G02B *21/06*

U.S. Cl. 350—526 **7 Claims**



1. An illumination apparatus for a microscope defining an observation beam path and an object plane disposed in said beam path, the apparatus comprising:

first optical means for conducting an illuminating bright-field light beam along a first optical axis for a bright-field illumination of an object;

second optical means for conducting an illuminating dark-field light beam along a second optical axis for a dark-field illumination of an object;

switching means for switching one of said light beams into said observation beam path and the other one of said light beams out of said observation beam path;

bright-field reflector means for reflecting at least one of said illuminating light beams into said observation beam path;

said first optical means and said second optical means being separate optical systems and being disposed relative to the microscope so as to cause said axes to intersect each other in the vicinity of said bright-field reflector means;

said first optical means including a first light source for supplying said bright-field light beam; and, said second optical means including a second light source for supplying said dark-field light beam; and,

said switching means including movable mirror means mounted at the point of intersection of said axes for switching between said bright-field illumination and said dark-field illumination.

4,687,305

MIRROR MOUNTING APPARATUS

Richard J. Harris, Jr., and Frank D. Pickens, both of Houston, Tex., assignors to Spy-Mirrors, Inc., Deer Park, Tex.

Continuation-in-part of Ser. No. 614,966, May 29, 1984, Pat. No. 4,549,790. This application Sep. 13, 1985, Ser. No. 775,572

The portion of the term of this patent subsequent to Oct. 29, 2002, has been disclaimed.

Int. Cl.[4] B60R *1/04*; G02B *7/18*

U.S. Cl. 350—624 **22 Claims**

1. A rear viewing system for allowing a driver to view occupants seated near the rear of a bus, the bus having interior walls subject to vibration as the bus moves, comprising:

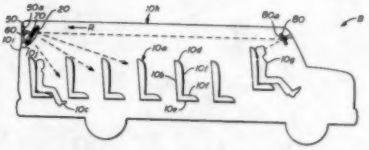
a mirror having an upper and lower end;

a backing support member;

attachment means with said mirror and said backing support member for securing said mirror to said backing support member;

means for mounting said mirror to an interior wall of the bus further comprising:

a lower strut having a first and a second end, said first end being mounted to the interior wall of the bus and said second end being pivotally mounted to said backing support member, adjacent said lower end of said mirror;



an upper strut having a first end and a second end, said first end being pivotally connected to the interior wall of the bus, and said second end being connected to said backing support member adjacent said upper end of said mirror;

said second end of said upper strut being adapted to translate with respect to said backing support member, thereby allowing said mirror to be selectively pivoted about said pivotal connection between said lower strut and said backing support member.

4,687,306

TUBULAR EYEGLASS FRAME

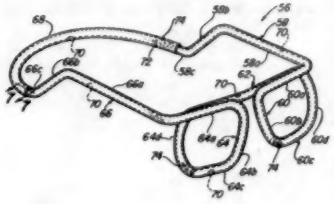
Erik Lipson, 8602 Hidden Hill La., Potomac, Md. 20854, and Melanie J. Sansom Smith, 1740 East West Hwy., Silver Spring, Md. 20910

PCT No. PCT/US86/00405, § 371 Date Aug. 22, 1986, § 102(e) Date Aug. 22, 1986, PCT Pub. No. WO86/05001, PCT Pub. Date Aug. 28, 1986

PCT Filed Feb. 25, 1986, Ser. No. 902,451

Int. Cl.[4] G02C *11/02, 1/00*

U.S. Cl. 351—51 **4 Claims**



1. An eyeglass frame of the type including first and second lens frame portions, a bridge portion interconnecting the lens frame portions, and pair of temple portions, the improvement wherein:

(A) said lens frame portions and said bridge portion are formed of a non-opaque material;

(B) a continuous passage extends through said lens frame portions and said bridge portion;

(C) a colored material is positioned within said passage to impart the color of the material to said lens frame portions and said bridge portion;

(D) said frame further includes a back portion interconnecting the free ends of the temple portions;

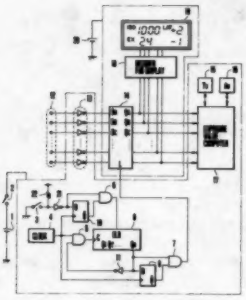
(E) said lens frame portions, bridge portion, temple portions, and back portion are configured and interconnected to form a continuous closed loop tubular passage; and

(F) said material is positioned in and around said closed loop passage.

4,687,307
INFORMATION READ-IN DEVICE FOR CAMERA

Toshifumi Ohsawa, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 688,306, Jan. 2, 1985, abandoned. This application May 8, 1986, Ser. No. 862,182
Claims priority, application Japan, Jan. 6, 1984, 59-596
Int. Cl.[4] G03B *7/24, 7/26*
U.S. Cl. 354—21 **11 Claims**



1. An information read-in device which reads in photographic information attached to a film container housed in a film container chamber of a camera by closing a cover of said chamber of the camera, comprising:

(a) a sensing circuit for sensing said information attached to a film container;

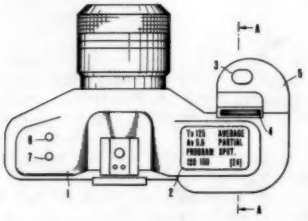
(b) a timer for counting a prescribed period of time after the closure of said cover; and

(c) a read-in circuit for reading in the information from said sensing circuit after an elapse of such period of time as regulated by said timer.

4,687,308
INFORMATION SETTING DEVICE FOR CAMERA

Hiromi Someya, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 4, 1986, Ser. No. 848,813
Claims priority, application Japan, Apr. 9, 1985, 60-053200[U]
Int. Cl.[4] G03B *29/00, 17/00*
U.S. Cl. 354—82 **6 Claims**



1. A camera having an information setting device comprised of a dial-shaped information setting operating member capable upon rotation of changing photographic informations, comprising:

(a) a grip for hold formed to a projected shape from the front surface of one side of the camera body in an optical axis center direction;

(b) a photographic information display device arranged on said one side of the camera body;

(c) a release button arranged on the upper surface of said grip for hold; and

(d) a dial-shaped information setting operating member arranged between said release button and said photographic information display device.

4,687,309
VIDEO CAMERA STABILIZER

Steven M. Breslau, Chicago, Ill., assignor to Sima Products Corporation, Chicago, Ill.

Filed Nov. 6, 1986, Ser. No. 927,550
Int. Cl.[4] G03B *17/00*
U.S. Cl. 354—82 **15 Claims**

1. A device for transporting a camera and for stabilizing said camera against the torso of a person which comprises:

an arm having at least two sections aligned such that one section is telescopically enjoyable within the other section;

means for locking said sections in place such that one section is prevented from sliding within the other section;

a mount located on one end of said arm, said mount including a ball and socket member interposed between said mount and said arm such that said mount is movable on a variable plane;

a generally arcuate-shaped bumper positioned on the end of the arm opposite said one end, said bumper including a resilient surface such that said bumper may comfortably rest against said torso of said person, said bumper further accommodating said arm at various angles relative to said torso of said person; and

a neck strap pivotally positioned adjacent said bumper wherein said neck strap is worn about the neck of said person such that when said device is to stabilize said camera said bumper rests against the torso of said person with said arm raised to place said camera at eye level, and when said device is to transport said camera said arm is lowered to allow said camera to be carried in front of or to one side of said person.

4,687,310
STEREOSCOPIC PHOTOGRAPHY CAMERA

Roger Cuvillier, 2 bis Avenue de la Ière Armée, 21000 Dijon, France

Filed Jun. 9, 1986, Ser. No. 871,895
Claims priority, application France, Jun. 12, 1985, 85 08885
Int. Cl.[4] G03B *35/08*
U.S. Cl. 354—115 **18 Claims**

1. A stereoscopic camera comprising

a photosensitive medium of two juxtaposed images arranged symmetrically to a symmetry plane perpendicular to the medium,

two first optical paths perpendicular to said medium, passing through centers of said images respectively, and spaced from a small stereoscopic base,

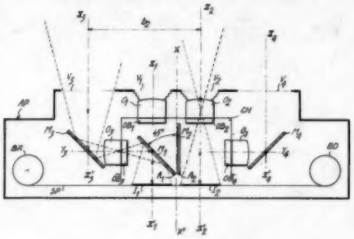
two second optical paths symmetrical to said symmetry plane and including two first optical sections which are

perpendicular to said medium and spaced from a large stereoscopic base,

two first lenses centered on said first optical paths, and

two second lenses located on said second optical paths,

said images being substantailly in an image focal plane common to said first and second lenses, and



said second optical paths including reflecting means for focusing incident optical beams directed along said first optical sections and crossing through said second lenses into said two juxtaposed images.

4,687,311

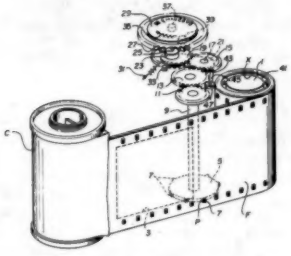
FILM-ON-SPOOL SENSOR FOR CONTROLLING FRAME COUNTER

Stephen G. Malloy Desormeaux, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 9, 1986, Ser. No. 861,387

Int. Cl.[4] G03B *17/36*

U.S. Cl. 354—217 **8 Claims**



1. An improved photographic camera of the type wherein (a) a take-up spool is adapted to wind a filmstrip onto said spool and (b) a frame counter provides a count of the number of frames exposed or remaining to be exposed on the filmstrip, and wherein the improvement comprises:

means for sensing the absence substantially of any film on said take-up spool; and

means operating in association with said sensing means, responsive to the absence substantially of any film on said take-up spool, for disabling said frame counter to prevent it from providing a frame count, whereby said frame counter will only provide a frame count whenever there is film wound on said take-up spool.

4,687,312

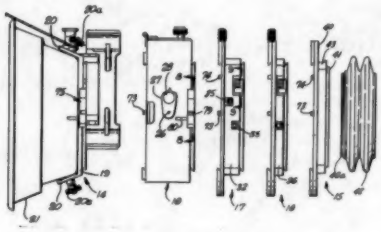
MATTE BOX ASSEMBLY

Felipe Navarro, Granada Hills, Calif., assignor to Panavision, Inc., Tarzana, Calif.

Filed Jun. 27, 1984, Ser. No. 625,012

Int. Cl.[4] G03B *11/00*

U.S. Cl. 354—295 **23 Claims**



1. A matte box assembly for a camera having a lens, comprising, a frame means for connecting to and supported from the camera separate from the lens and extending forwardly of the lens, a light shield means for engaging the camera lens, a plurality of interchangeable filter means selectively positioned between said frame means and said light shield means, said filter means having means for removably receiving a filter, and said frame means, light shield means and each filter means each having mating quick disconnect means thereon for selectively connecting the light shield means and filter means to and supporting same from said frame means, said quick-disconnect means comprising means for allowing rapid and selective lateral removal and replacement of each said filter means without rotation and without removing the frame means.

4,687,313

APPARATUS FOR PROCESSING SENSITIVE MATERIALS

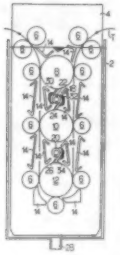
Hiroshi Taniguchi; Mitsumasa Tanizawa, and Masatoshi Ueno, all of Kyoto, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Japan

Filed Apr. 3, 1986, Ser. No. 847,519

Claims priority, application Japan, Apr. 30, 1985, 60-94372

Int. Cl.[4] G03D *3/02, 3/08*

U.S. Cl. 354—320 **5 Claims**



1. An apparatus for processing sensitive materials in which film comprising a sensitive material is conveyed through a tank filled with processing solution, said film being guided inside said tank by a plurality of conveying rollers, characterized by comprising:

at least one wiper means coming into contact with at least one of the plurality of conveying rollers facing to a film surface of the sensitive material for wiping said contacted roller, and;

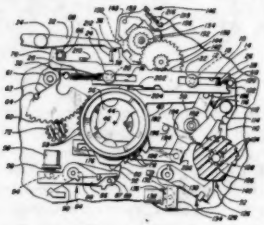
means for producing a directed flow of processing solution through the region of contact between the conveying roller and the contacting wiper means, whereby said directed flow removes away from said contacting region any material wiped from said conveying rollers by said wiper means.

4,687,314

SHUTTER RELEASE MECHANISM FOR AUTOMATIC CAMERAS

Klaus Raschke, Schaumburg, Ill., assignor to W. Haking Enterprises Limited, Hong Kong, Hong Kong

Filed Feb. 7, 1986, Ser. No. 825,797
Int. Cl.[4] G03B *3/00, 9/14, 9/62*
U.S. Cl. 354—400 **14 Claims**



1. In a camera having at least one of an adjustable focus lens movably responsive to a focus control member coupled thereto and movable over a range of positions establishing a range of focusing distances and an exposure control system adjustable over a range of exposure values responsively to the position of an exposure control member movable over a range of positions, control member drive means for operating at least one of said focus control member and said exposure control member to be driven over said range of positions from initial to final extreme positions thereof, locking control means for engagingly arresting the driven motion of said at least one driven control member according to scene sensings provided by at least one scene sensor, and a shutter system including shutter-actuating means movable against the force of a shutter energizing spring to be held in a cocked position by a releasable latch, said shutter-actuating means engaging said shutter to actuate a shutter exposure cycle during a terminal portion of the motion of the shutter-actuating means upon release of said latch, the improvement comprising:

velocity limiting means coupled to engage said shutter-acutuating means and limit the velocity thereof during an initial portion of the motion of said shutter-actuating means upon release of said latch and to disengage from said shutter actuating means prior to said engagement of said shutter; and

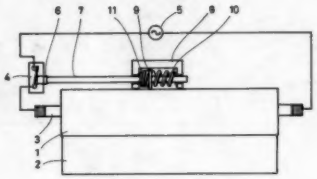
regulator means for coupling the motion of said shutter-acutating means to said at least one driven control member during said initial portion of the motion of said shutter-actuating means so as to limit the speed of movement of said at least one driven control member, said regulator means including releasing means for releasing said regulator means from the coupled condition when the motion of said at least one driven control member is arrested by said locking control means, said velocity limiting means disengaging from said shutter-actuating means after said shutter-actuating means has travelled at least a distance corresponding to operation of said at least one driven control member over its entire range of positions and before engaging said shutter.

4,687,315

TEMPERATURE CONTROLLER WITH SHAPE MEMORY ALLOY IN A FIXING DEVICE OF ELECTROPHOTOGRAPHIC COPYING MACHINE

Yoshihalu Fujii, Sakurai, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Nov. 10, 1983, Ser. No. 550,569
Claims priority, application Japan, Nov. 12, 1982, 57-199543
Int. Cl.[4] G03G *21/00*
U.S. Cl. 355—3 FU **3 Claims**



1. A temperature control system for fixing a toner image in an electrophotographic copying machine comprising:

a pair of fixing rollers provided for fixing a toner image onto a copy paper;

heating means for heating at least one of said fixing rollers to a critical temperature for fixing said toner image; and

a temperature sensitive device for controlling activation of said heating means comprising a shape memory alloy spring, a conventional spring, and a washer sandwiched between said shape memory alloy spring and said conventional spring said temperature sensitive device being juxtapositioned to said at least one heated fixing roller;

said shape memory alloy spring expanding when said fixing roller is heated to a temperature above said critical temperature so as to interrupt power to said heating means and contracting when temperature of said fixing roller drops below said critical temperature to restore said power to said heating means.

4,687,316

COMPUTER GRAPHICS COPY SYSTEM FOR TECHNICAL ILLUSTRATION

Timothy A. Dering, Rochester Hills, Mich., assignor to Chrysler Motors Corporation, Highland Park, Mich.

Filed Apr. 21, 1986, Ser. No. 854,251
Int. Cl.[4] G03G *21/00*
U.S. Cl. 355—3 R **4 Claims**

1. A method for converting a computer graphic display image into a finished illustration comprising the steps of:

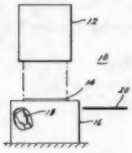
a. depositing a uniform electrostatic charge on a xerographic plate of the type having a photoconductive layered top surface,

b. disposing said charged xerographic plate in the path of said computer graphic display so that the radiated light pattern of the computer graphic display image is projected onto the photoconductive layered surface of said plate dissipating the charge in the exposed areas forming a latent electrostatic image of the computer graphic display image;

c. applying a toner developing material composed of toner particles of a predetermined color and of an electrostatic charge opposite to that of the latent electrostatic image so as to cause the toner particles to adhere to the latent electrostatic image forming a toner powder image in the predetermined color of the computer graphic display image, said predetermined color being a non-reproducible color;

d. transferring said toner powder image of the computer graphic display image onto a transparent material transfer sheet;

e. manually producing on said transfer sheet using a reproducible medium an enhanced image of said non-reproducible color image disposed on said transfer sheet to form a composite image including said non-reproducible color



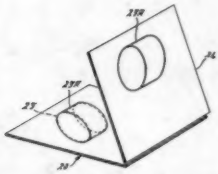


image superimposed by said reproducible enhanced image; and

f. copying said assembly containing said composite image so as to produce a finished illustration of said computer graphic display image.

4,687,317

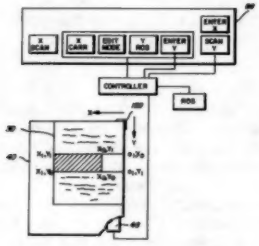
DOCUMENT SCANNING SYSTEM WITH SELECTIVE EDIT MODE

James J. Appel, Ontario; Daniel W. Costanza, Webster, and Richard M. Dastin, Fairport, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jun. 12, 1986, Ser. No. 873,579

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—3 R **5 Claims**



1. In a document reproduction machine wherein a document on a transparent platen support is reproduced as a latent image on a photosensitive record medium, a first optical system for scan/illuminating the document and for projecting an image thereof along an optical path onto said record medium,

a second optical system enabled in a document edit mode, said second system including a raster output scan assembly adapted to generate a light spot output, and further including means for modifying said light spot output and for directing said output along said first optical system optical path in a direction reverse to said projected image path, said light output forming a light cursor at the surface of said platen, said cursor visible to an operator through a document placed thereon, and

operator actuable means for moving said cursor spot along two coordinate directions to define areas of the document to be edited.

4,687,318

COPYING APPARATUS

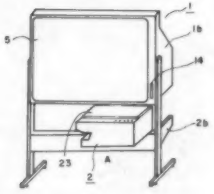
Sohei Shibasaki; Yasumasa Iwasaki, and Noriki Ono, all of Higashiyamatoshi, Japan, assignors to Casio Computer Co, Ltd. and Casio Electronics Manufacturing Co., Ltd., both of Tokyo, Japan

Filed Nov. 19, 1985, Ser. No. 799,646

Claims priority, application Japan, Dec. 25, 1984, 59-195423; Dec. 26, 1984, 59-272766; Mar. 11, 1985, 60-35179[U]

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—5 **5 Claims**



1. A copying apparatus for copying an image written on a display member, said copying apparatus comprising:

(i) a display unit comprising:

(a) a casing having an opening along one surface of said casing;

(b) a plurality of support rolls within said casing, each of said support rolls being rotatable about a vertical axis;

(c) a writeable and erasable display member comprising a sheet which is wrapped about said support rolls and which is adapted to be moved in a horizontal direction in response to rotation of at least one of said support rolls;

(d) said display member including a first portion which is positioned along a first flat plane exposed outside of said casing and along said casing opening, said display member including a second portion positioned along a second flat plane substantially perpendicular to said first flat plane, said second flat plane being adjacent one end of said casing, said first portion of said display member being adapted to move to said one end of said casing to be copied after an image is written on said display member first portion, said second flat plane being located within said casing; and

(e) a mirror and lens system located within a second end of said casing opposite from said one end of said casing, said system comprising means for conducting an optical image from the portion of said sheet positioned along said second flat plane of said sheet to a copying unit, wherein said copying unit is positioned beneath said second end of said display member casing; and

(ii) a copying unit comprising:

(a) a photosensitive body within said unit;

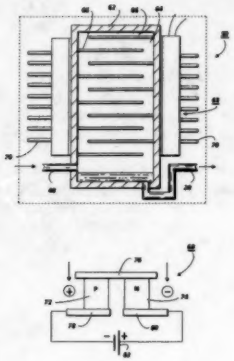
(b) an opening in said unit, said opening comprising means for receiving the optical image from said mirror and lens system to illuminate said photosensitive body; and

(c) means for producing an image on paper corresponding to the optical image received by said photosensitive body.

4,687,319
LIQUID CARRIER RECLAIMING APPARATUS

Satchidanand Mishra, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jun. 18, 1986, Ser. No. 875,832
Int. Cl.[4] G03G *15/10*
U.S. Cl. 355—10 **20 Claims**



1. An apparatus for reclaiming a developing liquid, including:

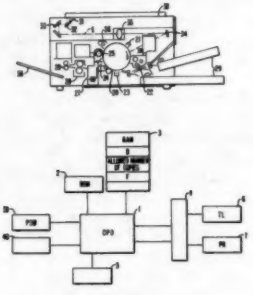
a housing defining a chamber having inlet and outlet ports with a developing liquid vapor entering the chamber through the inlet port and developing liquid exiting the chamber through the outlet port thereof; and

means for thermoelectrically cooling the developing liquid vapor in the chamber of said housing to liquefy the developing liquid vapor therein.

4,687,320
CONTROL SYSTEM FOR A COPIER

Yasushi Nakanishi, Yamatokoriyama, and Akihiko Taniguchi, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jan. 13, 1986, Ser. No. 818,480
Claims priority, application Japan, Jan. 30, 1985, 60-17972
Int. Cl.[4] G03G *21/00, 15/00*
U.S. Cl. 355—14 R **6 Claims**



1. A control system for an electrophotographic copier comprising

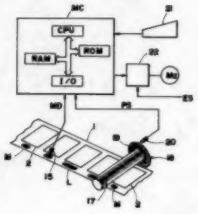
a detecting means for detecting that a container for discarded toner became full, and

a stopping means for stopping preparations for the operation of said copier after a selectably specified number of copies are produced by said copier after said detecting means detects that said container became full.

4,687,321
MARK DETECTION APPARATUS FOR A MICRO-ROLL FILM

Masaaki Itoh, Zama, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Oct. 23, 1985, Ser. No. 790,367
Claims priority, application Japan, Oct. 23, 1984, 59-223774
Int. Cl.[4] G06K *7/10*
U.S. Cl. 355—41 **3 Claims**



1. A mark detection apparatus for a microfilm having marks which are placed adjacent to respective frames and are classified into a few groups with different sizes, the apparatus comprising:

a mark detecting element for detecting the marks,

means for generating pulses in proportion to running of the microfilm,

means for identifying the number of pulses generated during the detection of individual marks,

means for establishing a threshold value from two numbers of pulses respectively corresponding to marks with different sizes.

a first counter for counting the number of detected marks with certain size,

a second counter for counting the number of detected marks with another size,

means for loading the number of marks of the first-detected size into either the first or the second counter before establishing the threshold value, and

means for setting the counters to particular values in which each of the counters is designated for the size of a mark after the threshold value is established.

4,687,322
PROJECTION OPTICAL APPARATUS

Akikazu Tanimoto, Yokohama; Shoji Ishizaka, Kawasaki; Yutaka Endo; Hiroyuki Suzuki, both of Tokyo, and Masamitsu Yanagihara, Kawasaki, all of Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan

Continuation of Ser. No. 826,979, Feb. 7, 1986, abandoned. This application Nov. 17, 1986, Ser. No. 931,013
Claims priority, application Japan, Feb. 12, 1985, 60-24601
Int. Cl.[4] G03B *27/52*
U.S. Cl. 355—55 **22 Claims**

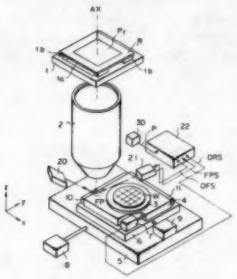
1. An apparatus for forming the optical image of a photo-pattern placed on a first plane on a second plane, comprising:

projection means having a projection optical system disposed between said first plane and said second plane to form said optical image;

focus detecting means including means for detecting the position of said second plane relative to said projection optical system, the in-focus position corresponding to the position of said second plane when the imaging plane of said projection optical system and said second plane are coincident with each other and being preset, said focus

detecting means putting out a detection signal when said in-focus position is detected by said detecting means;

fluctuation detecting means for determining the amount of fluctuation of the imaging plane of said projection optical system caused correspondingly to a variation in the refractive index of the atmosphere; and



means responsive to said fluctuation detecting means to control said focus detecting means so that said in-focus position is re-set correspondingly to the amount of fluctuation of said imaging plane determined by said fluctuation detecting means.

4,687,323

ROTARY SUCTION DRUM

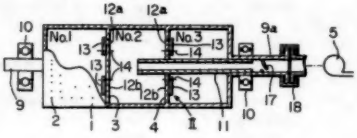
Teruo Fujii, Kyoto, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan

Filed Feb. 26, 1986, Ser. No. 833,584

Claims priority, application Japan, Mar. 7, 1985, 60-46075; Sep. 4, 1985, 60-195290

Int. Cl.[4] G03B *27/60*

U.S. Cl. 355—73 **7 Claims**



1. An apparatus for mounting a sheet of photosensitive material on the peripheral outer surface of a rotary suction drum, comprising:

a rotary cylinder rotatable at predetermined different speeds;

at least one vertical wall provided inside said rotary cylinder, said wall defining chambers within the cylinder, with said wall having at least two openings provided opposite to each other therein;

a conduit connected to any one of said chambers for applying suction to said chambers;

suction means connected to said conduit for applying suction therethrough to the chamber; and

valves provided on said wall for closing said openings, said valves being movable to the corresponding respective positions of said openings as said rotary cylinder rotates to cause a centrifugal force to act on said valves, said valves being urged toward the wall to airtightly close said corresponding openings by a differential pressure, caused by said suction, between the chamber around which the film is placed and the chamber around which no film is placed.

4,687,324

LASER-BASED MEASURING SYSTEM

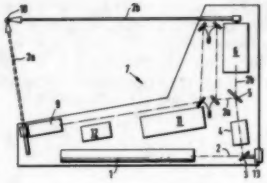
Gerd Selbach, Taubenstrasse 18, D- 4006 Erkrath 1, Fed. Rep. of Germany

Filed May 16, 1984, Ser. No. 610,978

Claims priority, application Fed. Rep. of Germany, May 18, 1983, 3318042; Mar. 24, 1984, 3410959

Int. Cl.[4] G01B *11/26, 11/14*

U.S. Cl. 356—1 **19 Claims**



1. A laser-based measuring system intended especially for measuring, tensioning or alignment procedures in machine tools with large workpieces and for measuring vibration in components which comprises a laser beam generating device, means to split a laser beam so produced so as to create a measuring signal and an equipment zero signal, deflectors positioned in each of the measurement beam path and the equipment zero laser path to deflect each laser beam into and rotate or oscillate each beam through a plane so that the measurement signal and the equipment zero signal may impinge upon a workpiece in planes set at different angles to its surface, one or more coordinate monitors to detect disruptive factors deriving from machine design or the environment, means for defining precisely the planarity of the light beam defined by the deflected laser beam and means for correcting the planarity thereof in case of disruption.

4,687,325

THREE-DIMENSIONAL RANGE CAMERA

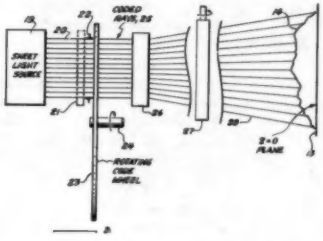
Nelson R. Corby, Jr., Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 28, 1985, Ser. No. 717,367

The portion of the term of this patent subsequent to Aug. 18, 2004, has been disclaimed.

Int. Cl.[4] G01C *3/00, 5/00, 11/12*

U.S. Cl. 356—1 **14 Claims**



1. A non-contact sensor system to measure range to an object from a reference plane comprising:

a pattern generator and projector to produce a $1 \times N$ array of time and space coded light rays whose intensities can each be varied with time, and to project P sequential presentations of different light ray patterns onto a three-dimensional object, where $P = 1 + \log_b N$, b is the number of brightness levels and N is the number of rays;

a linear array sensor which views, at an angle to projected light rays, points of light where said rays are incident on

the surface of said object, and generates one-dimensional scan signals which have ray peaks at locations corresponding to imaged light; and

a range profile processor to analyze said scan signals to uniquely identify all rays, determine depth from the displacement of said ray peaks from calibration, reference plane peaks, and provide a range map.

4,687,326

INTEGRATED RANGE AND LUMINANCE CAMERA

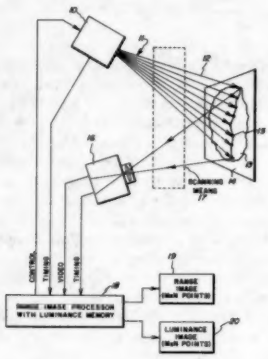
Nelson R. Corby, Jr., Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Nov. 12, 1985, Ser. No. 797,361

The portion of the term of this patent subsequent to Aug. 18, 2004, has been disclaimed.

Int. Cl.[4] G01C *3/08, 11/08*

U.S. Cl. 356—5 **11 Claims**



1. An integrated range and luminance camera comprising:

a planar pattern projector to generate a $1 \times N$ array of time and space coded light rays and to project P sequential presentations of modulated light patterns and an unmodulated pattern onto the surface of a three-dimensional object at the same place, where $P = 1 + \log_b N$, b is the number of brightness levels and N is the number of rays;

a linear array sensor which detects, at an angle to projected rays, light incident on the object and generates P one-dimensional scan signals having peaks at locations corresponding to the intersections of said light rays with the object surface, and an additional scan signal corresponding to brightness; and

a processor to analyze said P scan signals to uniquely identify all rays and determine range to the object surface at N points along a line, and to analyze said additional scan signal to determine luminance along that line, and to provide registered range and luminance images.

4,687,327

OIL MIST MONITOR

Michael R. Wheeless, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Feb. 25, 1985, Ser. No. 705,751

Int. Cl.[4] G01N *21/59*

U.S. Cl. 356—70 **15 Claims**

1. For use with an oil mist genrating apparatus forming an oil mist conveyed along a conduit with an air flow to apparatus using such an oil mist, oil mist monitoring apparatus comprising:

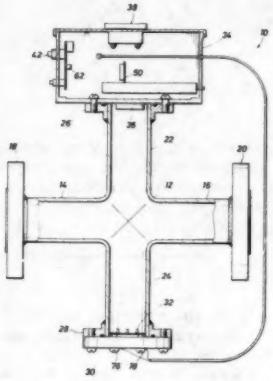
(a) a laterally extending open interior housing means adapted to be positioned at a location to conduct air borne oil mist thereacross;

(b) first monochromatic light forming means in said housing means for forming light illuminating said housing means across the oil mist passing therethrough;

(c) first light detector means in said housing means located to detect light from said monochromative light forming means across the oil mist passing through said housing means and forming a first output signal;

(d) a cooperative joinder to said housing means including, first and second separate flange mounting means adapted to join to said housing means to position and locate said first monochromatic light forming means and said first light detector meansand for directing light across said housing means;

(e) second light forming means providing reference light wherein said first light forming means and said second light forming means are similar to each other to form light in equal quantity in response to equal light forming currents;



(f) second light detector means positioned to detect reference light from said second light forming means;

(g) light opaque container means enclosing said second light forming means and said second light detector means to prevent internal light from entering therein and further positioning said second light detector means to view said second light forming means and forming a second output signal;

(h) means mounting said first and second light forming means in sufficient proximity to each other for exposure to common temperature variations;

(i) circuit means electrically comparing said first and second output signals to provide an output signal inversely related to opacity of the oil mist in said housing means; and

(j) output means provided with said output signal to indicate oil mist opacity.

4,687,328

BORE MEASURING SYSTEM

Takashi Shiraishi, Nagaokakyo, and Shiro Kitamura, Kyoto, both of Japan, assignors to Enushii Shangyo Co., Ltd., Kyoto, Japan

Filed Feb. 23, 1984, Ser. No. 582,845

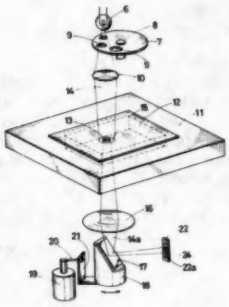
Claims priority, application Japan, Mar. 1, 1983, 58-34246

Int. Cl.[4] G01B *11/02*

U.S. Cl. 356—384 **11 Claims**

1. A bore measuring system comprising a light source in the form of a white lamp or a tungsten halogen lamp: an illuminating lens arranged to converge rays from said light source: a diaphragm having two or more holes of different diameters arranged to stop the light from said light source through any one of the holes before reaching said illuminating lens: an imagery lens positioned for reconvergence of the light through

said hole to be measured and through the illuminating lens: an image sensor arranged to receive the light onto the receiving surface and including a number of sensor elements arranged in a row and to transmit signal output from exposed sensor elements only as the sensor output: a reflector positioned to refract the convergent light from said imagery lens and to project onto the receiving surface of said image sensor for



optical image formation: a driving means connected to swing the reflector so that the optical image goes across the sensor elements on the image sensor: a signal output circuit connected to compare two successive output signals from the image sensor and to transmit the larger signal: and a display circuit connected to the output circuit to indicate the hole diameter based on the output signal from said signal output circuit.

4,687,329

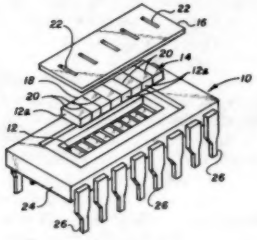
SPECTROPHOTOMETER

Steven G. Schultz, Winthrop Harbor, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Continuation of Ser. No. 714,312, Mar. 21, 1985. This application Dec. 12, 1986, Ser. No. 941,247

Int. Cl.[4] G01J *3/02, 3/36*

U.S. Cl. 356—328 **3 Claims**



1. In a spectrophotometer comprising:

(a) a flash lamp;

(b) a grating for receiving a beam of light delivered by the flash lamp which has passed through a sample for analysis; and

(c) a detector situated to receive the beam of light reflected by said grating; the improvement wherein the detector comprises:

a photodiode array assembly including:

a plurality of individual photodiodes situated in a first plane wherein a substantial portion of said photodiodes are separated one from the other by an externally electrically grounded photodiode to reduce electrical crosstalk;

a plurality of individual adjacent spectral filters situated substantially parallel to said first plane and contacting said plurality of photodiodes wherein an optically opaque material surrounds each of said spectral filters, whereby components of light are allowed to pass through one of said spectral filters to one of said individual photodiodes but said components of light are blocked, after entering said one of said filters, from passing through any other one of said filters such that light passing through each of said individual adjacent spectral filters will impinge upon only one of said individual photodiodes; and

a means for attentuating stray light, said means being situated substantially parallel to said first plane and adjacent to said plurality of individual spectral filters such that said means is located above each of said individual photodiodes.

4,687,330

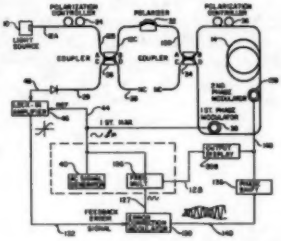
FIBER OPTIC ROTATION SENSOR WITH EXTENDED DYNAMIC RANGE

Herve C. Lefevre, Paris, France, assignor to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Filed Apr. 25, 1983, Ser. No. 488,111

Int. Cl.[4] G01C *19/64*

U.S. Cl. 356—350 **27 Claims**



1. In a Sagnac sensor having (1) an optical path forming a loop for counter-propagation of a pair of light waves, (2) means for causing a periodic phase modulation of said light waves at a first constant frequency, and (3) a device for combining said light waves after counter-propagating through said optical path to form an optical output signal which includes a signal component at said first constant frequency, an apparatus for sensing the phase difference between said waves caused by ambient effects such as rotation of said loop, said apparatus comprising:

a detector for detecting said signal component at said first constant frequency;

phase modulator means for causing a phase modulation of said light waves at a second constant frequency which is a harmonic of said first constant frequency;

means for controlling the amplitude of the phase modulation at said second constant frequency in response to the signal component detected by the detector to drive said signal component at said first constant frequency towards a predetermined value; and

indicator means, responsive to said controlling means, for indicating said phase difference.

4,687,331
RING LASER GYROSCOPE

Michael Holz, Newton Centre, and Terry A. Dorschner, Newton, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 822,690, Jan. 22, 1986, abandoned, which is a continuation of Ser. No. 379,679, May 19, 1982, abandoned. This application Oct. 15, 1986, Ser. No. 919,575
Int. Cl.[4] G01B *9/02*
U.S. Cl. 356—350 **7 Claims**

1. The method of determining the rate of rotation being imparted to a ring laser gyro comprising the steps of:

propagating electromagnetic waves having longitudinal modes of predetermined transverse indices in opposite directions in a ring resonator;

providing a frequency split between said electromagnetic waves propagating in opposite directions of each longitudinal mode;

producing a net gain to said electromagnetic waves throughout a frequency range greater than the frequency separation between two adjacent longitudianl modes;

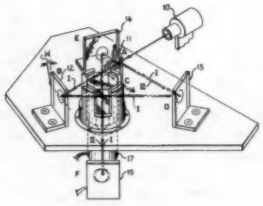
compensating for gain-induced frequency dispersion of said electromagnetic waves; and

producing an output signal as a function of the frequency split between at least two of said counter-propagating waves and determining the rate of rotation of the resonator from such output signal.

4,687,332
SELF-REFERENCING SCAN-SHEAR INTERFEROMETER

Noah Bareket, Saratoga, Calif., assignor to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.

Filed Oct. 15, 1985, Ser. No. 787,198
Int. Cl.[4] G01B *9/02*
U.S. Cl. 356—353 **4 Claims**



1. A self-referencing interferometer for measuring phase distribution of an optical beam wavefront, said interferometer comprising:

(a) means for splitting said optical beam into a first component and a second component, and for causing said first component to form a first pupil at an interference plane, and for causing said second component to form a second pupil at said interference plane, and for shearing said first pupil by a fixed amount relative to said second pupil along a shear axis on said interference plane;

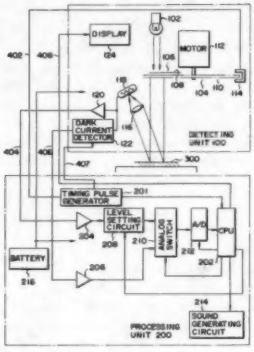
(b) means for causing a continuously and repetitively varying displacement of said first pupil with respect to time across said second pupil along a scan axis on said interference plane, said scan axis being perpendicular to said shear axis; and

(c) a linear array of photodetector elements arranged on said interference plane along said shear axis, each photodetector element of said array generating an electronic signal indicative of a temporally varying one-dimensional phase profile of a local portion of said optical beam wavefront, electronic signals from said linear array of photodetector elements providing inputs to an algorithm for reconstructing a two-dimensional phase distribution of said optical beam wavefront.

4,687,333
MEASURING APPARATUS FOR OPTICALLY MEASURING THE THICKNESS OF A WATER FILM

Suzuo Odasima, Ayase; Takao Hida, Ebina, and Mitsuru Mitamura, Yokohama, all of Japan, assignors to Toshiba Electronic Systems Co., Ltd. and Toshiba Machine Co., Ltd., both of Tokyo, Japan

Filed Dec. 18, 1985, Ser. No. 810,257
Claims priority, application Japan, Dec. 28, 1984, 59-275680
Int. Cl.[4] G01B *11/00*
U.S. Cl. 356—382 **4 Claims**



1. A measuring apparatus having a detecting unit and processing unit provided separately, for optically measuring the thickness of a water film attached to a surface of a substance such as a metal, comprising:

light radiation means provided in the detecting unit, for periodically radiating, on a surface of the water film, a reference beam having a wavelength that cannot be absorbed by the water film, and a measurement beam having a wavelength that is absorbed by the water film;

photoelectric conversion means provided in the detecting unit, for receiving the reference and measurement beams reflected by the water film, and for generating a reference signal and measurement signal responsive to quantities of the received beams;

processing means, which receives the signals generated by said photoelectric conversion means, for calculating the thickness of the water film in accordance with levels of the reference and measurement signals, and for temperature-correcting the calculated thickness of the water film, in response to levels of the signals that are output from said photoelectric conversion means when said photoelectric conversion means receives no beams reflected by the water film;

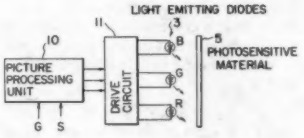
display means for displaying the temperature-corrected thickness of the water film; and

distance indicating means for receiving the reference signal, and for producing a sound responsive to a level of the received signal, the level of the reference signal varying in response to a distance between the detector unit and the water film.

4,687,334
METHOD FOR ADJUSTING DENSITY OF COLOR PICTURE IN COLOR PICTURE OUTPUT DEVICE

Tadashi Miyakawa, Kaisei, Japan, assignor to Fuji Photo Film Co., Ltd., Ashigara, Japan

Filed Apr. 11, 1985, Ser. No. 722,214
Claims priority, application Japan, Apr. 17, 1984, 59-77306
Int. Cl.[4] G01J *3/40*
U.S. Cl. 356—404 5 Claims



1. A method for adjusting a density of a color picture outputted on a photosensitive material with a plurality of luminescent colors in a color picture output device comprising the steps of:

preparing a test pattern print of the color picture on which color step tablets are provided stepwisely with densities divided at predetermined widths of densities between a highest color density and a lowest color density with respect to three primary colors;

designating step numbers of the color step tablets in accordance with shades thereof;

preparing a standard pattern plate on which standard color patches provided with light and high densities are printed with respect to the three primary colors;

visually comparing the densities of the step tablets with those of the standard color patches with respect to the three primary colors;

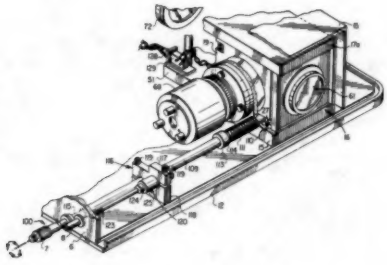
respectively inputting step numbers of the step tablets corresponding to the standard color patches obtained by the comparing step; and

calculating gain and offset of the luminescent colors of the output device so as to thereby adjust the output densities of the picture colors of the color picture in accordance with the inputted step numbers.

4,687,335
TEMPERATURE COMPENSATION MEANS FOR A RADIOMETER

Joseph E. Zupanick, and Clarence Braun, both of Richardson, Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Dec. 9, 1985, Ser. No. 806,961
Int. Cl.[4] G01J *3/51*
U.S. Cl. 356—416 7 Claims



1. A radiometer for detecting certain components of luminescense and reflected light energy contained in a light beam from a target wherein the reflected light includes a particular Fraunhofer line, said radiometer comprising:

a housing having an aperture therein for receiving said light from said target;

an optical filter assembly in said housing comprising:

a base plate;

a mount pivotably mounted on said base plate for rotation about an axis;

an optical passband filter mounted in said mount and positioned directly in the path of at least a fraction of said light beam, said filter having a center frequency substantially equal to the frequency of said particular Fraunhofer line, said filter being tunable to its said center frequency by angularly positioning said mount about its axis;

an adjustment rod in said housing having one end in contact with said mount whereby longitudinal movement of said rod changes the angular position of said mount about said axis;

means for sensing the longitudinal position of said adjustment rod and generating a first signal representative thereof.

a sensor means for sensing the temperature of said filter and generating a second signal representative thereof;

processing circuitry means comprising:

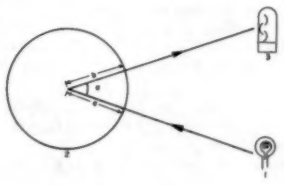
means for comparing said first and second signals and generating an error signal representative of the difference between said signals; and

means operably connected to the other end of said adjustment rod for longitudinally moving and adjusting said adjustment rod in response to said error signal to thereby retune said filter to its said center frequency when changes in temperature occur.

4,687,336
MEASUREMENT OF OPTICAL DENSITY VIA NEPHENOMETRY

John G. Pumphrey, Lewisville, and Robert E. Shanks, Grapevine, both of Tex., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Mar. 5, 1985, Ser. No. 708,471
Int. Cl.[4] G01N *21/00*
U.S. Cl. 356—436 5 Claims

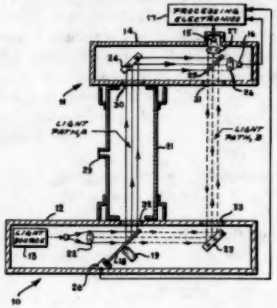


1. A method for measuring the formation of optical density at 350 to 700 nm in a material, said method comprising (a) directing through a first sample which includes a solution of the material and a light-scattering means suspended therein, a first beam of light having a wavelength in the range of 350 to 700 nm at which the material absorbs light, (b) measuring the scattered intensity of the light leaving the first sample at a given angle, (c) directing a beam of light having characteristics at least substantially the same as those of the first beam through a second sample which, optically, is substantially identical to the first sample except that the solution of the material which absorbs light at the indicated frequency is not present, (d) measuring the scattered intensity of the light leaving the second sample at the given angle, and (e) comparing the measurements of scattered intensity from steps (b) and (d).

4,687,337
ATMOSPHERIC AEROSOL EXTINCTIOMETER

Harold S. Stewart, No. Andover; Donald F. Hansen, Needham, and Vernon D. Turner, Lincoln, all of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Sep. 2, 1981, Ser. No. 298,687
Int. Cl.[4] G01N *21/61*
U.S. Cl. 356—437 **1 Claim**



1. An atmospheric aerosol extinctiometer comprising

a transmitter including light source means for generating a beam of radiant energy,

a receiver including a first radiant energy detection means said detection means being positioned to receive said beam of radiant energy and having an output responsive to differences in received raidant energy beam power, said output being a function of the coefficient of extinction of ambient air under test,

an optical system establishing first and second radiant energy beam paths between said light source means and said first radiant energy detecting means, said first and second beam paths alternately transversing a region of ambient air,

beam switching means comprising a rotatable sector mirror in intercepting relationship with said beam for directing said beam alternately through said first and second beam paths,

air filter means for filtering aerosols from the region of ambient air traversed by one of said beam paths, said air filter means being adapted to filter alternately the regions of ambient air traversed by said first and second beam paths,

a second radiant energy detection means positioned to receive beam radiant energy, the output thereof comprising a monitor of beam power,

synchronous pick up means monitoring sector mirror rotation,

a processing electronic circuit receiving the outputs of said first and second radiant energy detector means and the output of said synchronous pick up means, said processing electronic circuit developing the coefficient of extinction γ of ambient air under test by means of the equation

$$\gamma = \frac{\sqrt{2}\,\pi R_o}{2R_f}\;\frac{V_{rmsB} - V_{rmsA}}{LV_{DC}}$$

R_o being the DC responsivity of said first radiant energy detection means, R_f being the responsivity at frequency f of said first radiant energy detection means, $V_{rms\ A}$ and $V_{rms\ B}$ corresponding to the ambient air under test in said first and second paths respectively, L being the length of the region of ambient air under test, and V_{DC} is the DC signal output of said second radiant energy detection means,

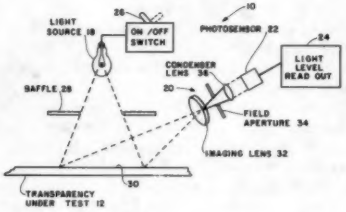
a first enclosed housing containing said transmitter, said first enclosed housing having a first window to accommodate said first beam path and a second window to accommodate said second beam path, and

a second enclosed housing containing said receiver, said second enclosed housing having a third window to accommodate said first beam path and a fourth window to accommodate said second beam path, said first, second, third and fourth windows being ZnSe, said light source means comprising a graybody source operating at not less than 1400° K., and said first and second radiant energy detection means being pyroelectric detectors.

4,687,338
METHOD OF MEASUREMENT OF HAZE IN TRANSPARENCIES

Harry L. Task, Dayton, and Louis V. Genco, Enon, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 2, 1983, Ser. No. 463,191
Int. Cl.[4] G01N *21/47*
U.S. Cl. 356—446 **10 Claims**



1. A method of measuring haze of an aircraft transparency, comprising the steps of:

a. illuminating a preselected test area of a surface of said aircraft transparency on the aircraft with a light source of known intensity and measuring the intensity of light back scattered from said test area to a preselected position to produce a first reading representative of the level of light scattered by said test area of said transparency;

b. illuminating a standard surface area of size equal to said test area with said light source and measuring the intensity of light back scattered therefrom to said preselected position to produce a second reading representative of the level of light scattered by said standard surface; and

c. calculating the ratio of said first reading to said second reading to define a quantitative measure characterizing the degree of haze of said transparency.

4,687,339
INSTALLATION FOR THE DISPERSION OR EMULSIFICATION OF A MASS CONSISTING OF AT LEAST TWO PRODUCTS

Hanspeter Seeger, Sulzbachstr. 13, D-7801 Ballrechten Dottingen, Fed. Rep. of Germany

Filed Apr. 10, 1985, Ser. No. 721,556
Claims priority, application Fed. Rep. of Germany, Apr. 11, 1984, 3413675
Int. Cl.[4] B01F *5/06, 7/00*
U.S. Cl. 366—305 **11 Claims**

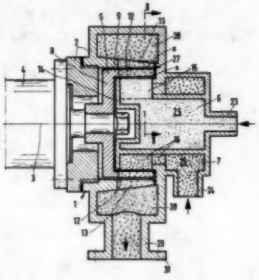
1. Apparatus for dispersion or emulsification of a fluid medium of at least two components comprising:

a stator;

a rotor journalled for rotation in close proximity to said stator and separated therefrom by a small gap;

through passages in said rotor;

a plurality of spaced inlets in said stator and opening radially to said gap, there being at least one inlet for each of said components;



said through passages, said gap and said inlets defining at least one shearing field at the interface of said rotor and stator; and

means adjacent said rotor oppositely of said stator for collecting said dispersion or emulsification.

4,687,340

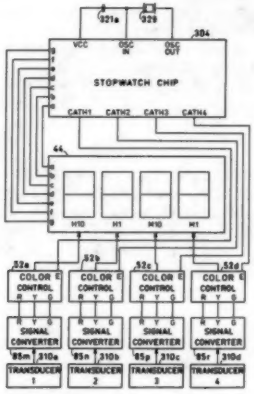
ELECTRONIC TIMEPIECE WITH TRANSDUCERS

Karel Havel, P.O. Box 66, Station M, Toronto, Ontario, Canada M6S 4T2

Division of Ser. No. 817,114, Jan. 8, 1986, Pat. No. 4,647,217. This application Oct. 16, 1986, Ser. No. 919,425

Int. Cl.[4] G04B *47/00;* **G09G** *1/28*

U.S. Cl. 368—10 **10 Claims**



1. The method of simultaneously indicating values of time and values of a plurality of quantities, on a display means including a plurality of variable color display elements, by causing values of time to be indicated on said display means in a character format and by independently controlling the color of each said display element in accordance with values of respectively different quantities.

4,687,341

TIMER

Jacques Müller, Reconvilier, and Alexandre Cassani, Lausanne, both of Switzerland, assignors to ETA SA Fabriques d'Ebauches, Granges, Switzerland

Filed Apr. 25, 1986, Ser. No. 855,646

Claims priority, application Switzerland, Apr. 30, 1985, 1827/85

Int. Cl.[4] G04F *8/00;* **G04B** *19/06*

U.S. Cl. 368—109 **27 Claims**

1. Electromechanical timer comprising a time base establishing a constant reference period, a device for setting the interval of tiem to be measured, including a setting member provided with a scale calibrated in units of time, a device for generating an alarm signal, and means for counting the number of reference periods contained in said interval and, on timing-out, for triggering said generating device, wherein said setting device is of the stepping type and comprises a transducer for the position of said setting member which is capable of generating a pulsed signal, the number of pulses of which represents the displacement of said setting member and, consequently, the interval to be measured, and wherein said counting mans comprise an accumulator circuit connected to said transducer to be loaded with the number of pulses produced thereby and connected to said time base to count a number of periods of the latter until there is coincidence of a value corresponding to said number of pulses, said accumulator circuit being also connected to said generating device to trigger this device when said value is reached, wherein said accumulator circuit comprises a first counter for storing the number of pulses of said pulsed signal, a second counter, a scale conversion matrix capable of producing a time value for each pulse generated by said transducer, and a comparator, said matrix being connected to one of the inputs of said comparator which is connected at its other input to said second counter connected to said time base for storing reference periods of the latter, and said comparator being connected to trigger said alarm signal generating device when it establishes equality of the values applies at its two inputs, said setting member having a non-linear scale.

4,687,342

THERMAL RADIATION MEASURING SYSTEM WITH A RADIATION MEASURING DEVICE AND A SHIELDED REFERENCE DEVICE

Peter Betzler, Munich, and Karl-Friedrich Mast, Garching, both of Fed. Rep. of Germany, assignors to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V., Fed. Rep. of Germany

Filed Jan. 18, 1985, Ser. No. 692,843

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1984, 3401946; Mar. 9, 1984, 3408724

Int. Cl.[4] G01J *5/20;* **G01K** *17/00*

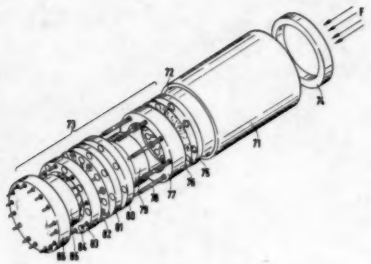
U.S. Cl. 374—32 **30 Claims**

1. A radiation measuring device comprising:

an electrically insulative carrier foil having a first surface and an opposite surface;

an absorber layer having a preselected sized and shape disposed on said first surface of said carrier foil, said absorber layer being heated by the absorption of incident radiation to be measured;

a high-value resistor layer operative to be heated by said abosorber layer, said high-value resistor layer being disposed on said opposite surface of said carrier foil proximate said absorber layer;



a thermally conductive layer interposed said absorber layer and said carrier foil having portions laterally protruding from said abosorber layer along said first surface of said carrier foil; and

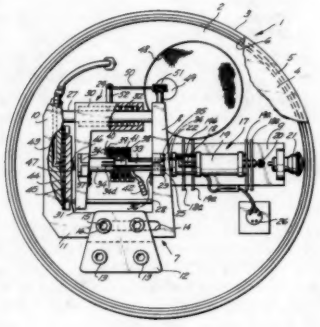
means for dissipating heat in thermally conductive contact with said laterally protruding portions of said thermally conductive layer such that the heat to be dissipated from said absorber layer is conducted by said thermally conductive layer to said means for dissipating heat, said means for dissipating heat further comprising means for shielding said thermally conductive layer from said incident radiation.

4,687,343

DEFORMATION DILATOMETER PLATENS

Karl-Heinz Raffalski, Wheatley Heights, N.Y., assignor to Theta Industries, Inc., Port Washington, N.Y.

Filed Sep. 9, 1983, Ser. No. 530,502
Int. Cl.[4] G01N *25/16*
U.S. Cl. 374—56 **15 Claims**



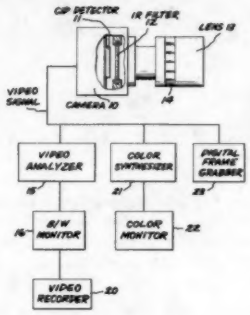
7. Specimen deforming platen for a deformation dilatometer, said platen having a smooth flat surface adapted to abut a dilatometer specimen, thereby forming an interface between said platen and said specimen and at least said smooth flat surface being made of a material selected from fused silica and quartz to avoid microscopically visible migration of both said platen and said specimen across said interface that would lead to anomalous dilatometer readings.

4,687,344

IMAGING PYROMETER

Robert D. Lillquist, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Feb. 5, 1986, Ser. No. 826,391
Int. Cl.[4] G01J *5/02*; H01H *5/33*
U.S. Cl. 374—124 **6 Claims**



1. An imaging pyrometer to measure the surface temperature of remote objects above about 400° C. comprising:

a sensor head comprised of:

(a) a solid-state video camera having a two-dimensional charge injection device silicon detector which responds to radiation wavelengths in the hear-infrared up to approximately 1100 nanometers and is operated in a fixed gain mode to have a video signal output proportional to incident radiant power flux,

(b) a lens system with or more known, reproducible aperture settings to image said object on a focal plane of the detector;

(c) an infrared filter in the optical path in the sensor head betwee said lens system and detector having a cut on wavelength beteen 700 and 900 nanometers to eliminate extraneous light; and

means for quantitatively determining from said video signa and displaying the temperature at any point on the surface of said object within the field of view of said sensor. with the display being along variable positioned cursor lines.

4,687,345

LINEAR MOTION ROLLER BEARING ASSEMBLY HAVING A ROLLER SEPARATOR

Toshiaki Geka, Funabashi, Japan, assignor to Nippon Thompson Co., Ltd., Tokyo, Japan

Filed Jul. 14, 1986, Ser. No. 885,044
Claims priority, application Japan, Jul. 16, 1985, 60-155038
Int. Cl.[4] F16C *29/06*
U.S. Cl. 384—44 **6 Claims**

1. A linear motion rolling contact bearing assembly, comprising:

first member extending straight over a predetermined distance;

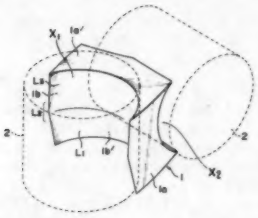
second member mounted on said first member slidably along said first member;

an endless path having a first section defined between said first and second members and a second section defined in said second member having both ends connected to corresponding ends of said first section;

a plurality of rollers provided in said endless path, whereby a rolling contact is provided between said first and second members by those rollers located in said first section; and

a plurality of roller separators each of which is interposed

between two adjacent ones of said plurality of rollers, each of said separators being provided with a pair of roller-receiving recesses one on each of opposite sides



thereof, each of said pair of roller-receiving recesses being capable of holding an associated roller in different orientations depending on the location along said endless circulating path.

4,687,346

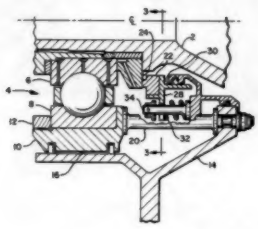
LOW PROFILE BEARING SUPPORT STRUCTURE

Gabriel L. Suciu, Glastonbury, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Sep. 2, 1986, Ser. No. 902,986

Int. Cl.[4] **F16C** *27/00, 33/72;* **F16J** *15/34;* **F01D** *25/16*

U.S. Cl. 384—99 **6 Claims**



1. A bearing support having

a fixed support structure,

a rotating shaft positioned within the fixed support structure,

a bearing for the shaft having a non-rotating outer race,

a supporting ring for receiving the outer race,

an oil damping structure radially interposed between the supporting ring and the fixed supporting structure,

a radially extending sealing surface, disposed about the shaft and rotating therewith,

a seal ring disposed axially adjacent the annular sealing surface,

means for radially positioning the seal ring relative to the sealing surface, and

means for resiliently positioning the supporting ring relative to the fixed support structure,

characterized in that:

the seal ring positioning means defines a corresponding radial displacement band;

the supporting ring positioning means defines a corresponding radial displacement band; and

the seal radial band overlaps the supporting ring radial band.

4,687,347

AXIAL JOINT ARRANGEMENT WITH INTEGRATED SEAL

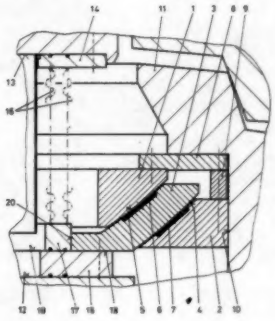
Bernd Kottwitz, and Norbert Löser, both of Püttlingen, Fed. Rep. of Germany, assignors to SKF GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Feb. 13, 1986, Ser. No. 829,430

Claims priority, application Fed. Rep. of Germany, Feb. 16, 1985, 8504433[U]

Int. Cl.[4] **F16C** *25/04*

U.S. Cl. 384—141 **6 Claims**



1. An axial joint arrangement with integrated seal having first, second and third successively arranged bearing rings, said third bearing ring lying between said first and second bearing rings, said first and second bearing rings having spherical guiding surfaces which slidably abut respective spherical bearing surfaces on said third bearing ring for enabling relative rotation of said third bearing ring therebetween, said guiding surface of said first bearing ring serving to center and guide said third bearing ring and said guiding surface of said second bearing ring serving to transmit operating loads to said third bearing ring; the improvement wherein a first sealing disk is attached to said third bearing ring, said first sealing disk having a first face arranged to abut a first sealing surface and a second surface arranged to abut an intermediate disk, said intermediate disk being connected to a second sealing disk by way of an axially flexible sealing element, said second sealing disk being connected to a second sealing surface.

4,687,348

DEVICE FOR LOCKING/UNLOCKING ROTATION OF AN ECCENTRIC BEARING USED IN A COMPRESSION RATIO CHANGING MECHANISM OF AN INTERNAL COMBUSTION ENGINE

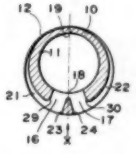
Takao Naruoka, Mishima; Yoshihito Moriya, Takahama, and Touru Ichimiya, Mishima, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Jun. 19, 1986, Ser. No. 876,168

Claims priority, application Japan, Jun. 20, 1985, 60-132989

Int. Cl.[4] **F16C** *23/02;* **F02D** *13/02*

U.S. Cl. 384—255 **22 Claims**



1. A device for locking/unlocking rotation of an eccentric

bearing having a cylindrical outside surface and a cylindrical inside surface eccentric with respect to the outside surface interposed between an outside surface of a piston-pin and an inside surface of a small end hole of a connecting rod of an internal combustion engine, said locking/unlocking device comprising:

a first lock hole and a second lock hole formed in said eccentric bearing, said first lock hole and said second lock hole extending in a radial direction of said eccentric bearing;

a first guide groove and a second guide groove formed in a radially outer portion of said eccentric bearing, said first guide groove and said second guide groove extending in circumferential directions, opposite to each other, of said eccentric bearing from said first lock hole and said second lock hole, respectively;

a first colliding surface and a second colliding surface formed in said eccentric bearing, said first colliding surface and said second colliding surface being opposed to said first guide groove and said second guide groove, respectively, and being positioned radially outside of a deepest portion of a bottom of said first guide groove and a deepest portion of a bottom of said second guide groove, respectively;

at least one lock-pin hole formed in said connecting rod, said lock-pin hole extending along an extension of a radius of said eccentric bearing corresponding to a locus of rotation of said first lock hole and said second lock hole;

at least one lock-pin slidably inserted in said at least one lock-pin hole; and

means for driving said at least one lock-pin, said means being fluidly connected to said at least one lock-pin hole.

4,687,349

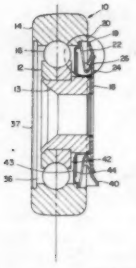
BEARING ASSEMBLY WITH FULL CONTACT SEAL

Martin Pachuta, Apopka, Fla., assignor to Jervis B. Webb Company, Farmington Hills, Mich.

Filed Jul. 16, 1986, Ser. No. 886,018

Int. Cl.[4] F16C *33/76, 33/78;* **F16J** *15/32, 15/54*

U.S. Cl. 384—477 **6 Claims**



1. A full contact seal for a bearing assembly having an inner race, an outer race, antifriction bearing elements interposed between said races; an axially outer shield associated with said inner race and extending radially to an outer periphery positioned adjacent to a portion of said outer race; an annular sealing ring fixed to said outer race and extending radially inwardly therefrom adjacent to and in axially inwardly spaced relation with said shield, the inner periphery of said annular sealing ring being formed with an annular, radially outwardly facing groove positioned between said annular sealing ring and said shield, said groove having an axial surface portion and axially spaced radial side surface portions; said contact seal comprising an annular resilient sealing member having a radially inner base portion adapted to seat in said groove, an axially outer sealing lip extending radially and axially outwardly from said base portion into compressive sealing engagement with said shield, and an axially inner sealing lip extending radially outwardly and axially inwardly from said base portrion into compressive sealing engagement with said annular sealing ring, said annular sealing member being radially and axially expandable and contractable and having a normal unexpanded size such that said base portion is expandable radially for insertion in said groove and frictionally engages said surface portions of said groove by radial anc axial contraction.

4,687,350

SEALED BEARING FOR RING ROLLER OF COLD PILGER ROLLING MILL

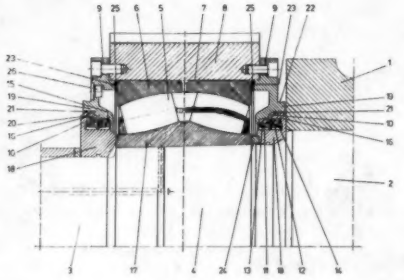
Günter Vogt, and Heinrich Winter, both of Schweinfurt, Fed. Rep. of Germany, assignors to SKF GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Nov. 8, 1985, Ser. No. 796,283

Claims priority, application Fed. Rep. of Germany, Nov. 9, 1984, 3440957

Int. Cl.[4] F16C *33/76;* **F16J** *15/38*

U.S. Cl. 384—481 **6 Claims**



1. In a sealed bearing arrangement for the rollers of a cold rolling mill, comprising a rolling bearing mounted on a journal of a rolling shaft and seated in the bore of a chock, and a separate housing cover fastened to each axial end of said chock adjacent the respective sides of said rolling bearing, each of said housing covers having a bore , and separate sealing means arranged in each of said bores; the improvement wherein said bearing has an inner ring and outer ring with opposite sides adjacent separate ones of said housing covers, each of said sealing means being comprised of first and second sliding rings and first and second O-ring seals, said rolling bearing further comprising first and second washers positioned radially inwardly of said first and second covers respectively and the respective first and second sliding rings and extending adjacent to opposite sides of said inner ring, said first and second sliding rings of each pair having mutually abutting end surfaces and having first and second outer conical circumferential surfaces respectively resiliently radially outwardly supported by the respective first and second O-ring seals, said first and second O-ring seals in turn being radially outwardly supported by conical bore surfaces formed on the respective housing cover and on the respective washer, said arrangement further comprising a shim ring inserted between a side surface of at least one of said rings of said rolling bearing and a supporting shoulder surface of the adjacent said housing cover or washer.

4,687,351

MEANS FOR SECURING A BEARING TO A SHAFT

Howard Martinie, Simpsonville, S.C., assignor to Reliance Electric Company, Greenville, S.C.

Continuation-in-part of Ser. No. 677,688, Dec. 3, 1984. This application May 27, 1986, Ser. No. 867,776

Int. Cl.[4] F16C *35/063*

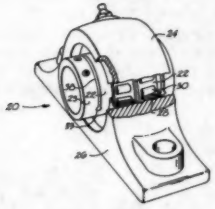
U.S. Cl. 384—541 **19 Claims**

1. A means for securing to a shaft a bearing having bearing elements, comprising:

a. an inner race having a raceway disposed around the shaft for receiving the bearing elements;

b. at least one annular end portion disposed around the shaft, extending axially from said raceway, and having a circumferentially continuous outer end;

c. a plurality of screws threaded radially through said end portion for contacting the shaft; and



d. a through-cut slot defined in said end portion spaced inwardly from said outer end, said slot being completely bounded peripherally by said end portion and extending in the circumferential direction in said end portion between said screws and said raceway; said through-cut slot reducing stress concentration between said raceway and said screw and minimizing deflection in said raceway originating from distortion in said end portion caused by said screws contacting the shaft.

4,687,352

PRINTER WITH AN IMAGE READER

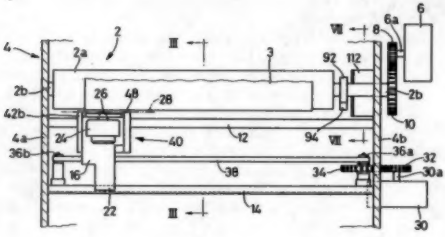
Hisashi Igi, Nagoya; Eiichi Ohta, Handa; Yasuhito Bandai, and Kazuhiko Takagi, both of Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Filed Dec. 26, 1985, Ser. No. 813,510

Claims priority, application Japan, Dec. 29, 1984, 59-199957[U]; Dec. 29, 1984, 59-199958[U]; Dec. 29, 1984, 59-199960[U]

Int. Cl.[4] B41J *3/44*

U.S. Cl. 400—73 **15 Claims**



1. A printing apparatus with an image reading function, comprising:

an elongated platen for supporting a recording medium;

a guide rod having a circular shape in transverse cross section and extending parallel to said platen;

a carriage slidably movable on said guide rod;

a printing head mounted on said carriage;

an image reading device slidably movable on said guide rod in an axial direction of the guide rod, and slidably pivotable on and about said guide rod, said image reading device including an image-reading portion provided at a position away from an axis of said guide rod, for reading images on the recording medium, said image reading portion being pivotable about said guide rod between a reading position adjacent the recording medium, and a retracted position spaced from said reading position in a direction away from the recording medium; and

connecting means for connecting said image reading device to said carriage so as to permit said image reading device to move together with said carriage.

4,687,353

AUTOMATIC FORMAT, MODE CONTROL AND CODE CONVERSION FOR DATA PROCESSING AND PRINTING APPARATUS

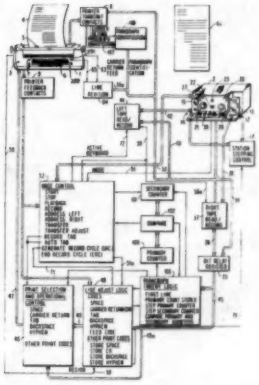
Peter J. DeGeorge, Lexington, Ky.; Roger F. Ross, and Donald E. Sims, both of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 228,733, Feb. 23, 1972, Pat. No. 4,596,478, which is a continuation of Ser. No. 871,424, Oct. 22, 1969, abandoned, which is a continuation-in-part of Ser. No. 609,670, Jan. 16, 1967, abandoned. This application Apr. 28, 1986, Ser. No. 856,457

The portion of the term of this patent subsequent to Jun. 24, 2003, has been disclaimed.

Int. Cl.[4] B28C *7/04*; G06F *15/12*

U.S. Cl. 400—76 **25 Claims**



1. A method of formatting data including format codes and character codes, said method comprising the steps of:

detecting the beginning of a block of data including at least two lines;

storing the location of the first potential character position of the first line of said block of data; and

causing all lines of data subsequent to said first line of data to begin in alignment with said first potential character position.

4,687,354

DOT MATRIX PRINTER HEAD

Kazumi Tanaka, Hamadayama 4-27-25, Suginami-ku, Tokyo, Japan

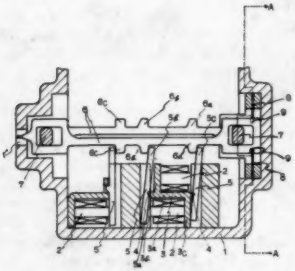
Filed Sep. 12, 1985, Ser. No. 775,404

Int. Cl.[4] B41J *3/12*

U.S. Cl. 400—121 **6 Claims**

1. A dot matrix printing head comprising a casing, a plurality of contiguously disposed printing elements mounted in said casing for movement between an operative printing position and an inoperative non-printing position, actuating means operating on said printing elements to drive said elements toward an operative printing position, said actuating means including a chair shaped yoke mounted in said casing, said yoke each including oppositely disposed off-set portions, an electromagnet connected to said respective off-set portions whereby said electromagnets are staggered and oppositely disposed, at least one pivoting armatures fulcrumed on each opposite side of said yoke whereby said armatures complement

a corresponding printing element, protruding means formed on said corresponding printing element for engaging the end of its complimentary armature whereby the actuation of said electromagnets cause said armature to pivot about its fulcrum to shift the associated printing element toward its operative position; the end of said armature acting on one side of said protruding means only.



4,687,355

PRINTING HEAD FOR USE IN DOT PRINTERS

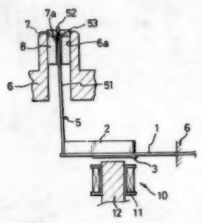
Tsutomu Ikehata, Saitama; Katsuya Masuda, Tokyo; Makoto Yasunaga, Saitama, and Takao Michioto, Tokyo, all of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Sep. 24, 1985, Ser. No. 779,644

Claims priority, application Japan, Sep. 25, 1984, 59-144698[U]

Int. Cl.[4] B41J *3/52*

U.S. Cl. 400—124 **2 Claims**



1. A printing head for use in dot printers having a plurality of printing wires disposed in alignment with each other and selectively driven for reciprocal motion to perform printing, comprising:

printing wires each formed by main body members made of high speed steel, and chip members made of a Re-Ru-Ta alloy and welded to respective outer tip ends of said main body members;

a wire guide member formed with a hole therein for respectively contacting and guiding said outer ends of printing wires for reciprocal motion of said wires, said wire guide member being made of zirconia;

wherein said printing head further includeds a felt member containing an oil, said felt member being disposed inwardly of said wire guide member, said printing wires respectively being brought into direct contact with said felt member during reciprocal motion of said printing wires; and further including

leaf springs each supporting a corresponding one of said main body members; and

a frame supporting said leaf springs, said frame having an outer wall formed therein with a through hole;

wherein said wire guide member has an inner end face, a corresponding said felt member being fitted into the through hole formed in said frame and disposed at a location adjacent the inner end face of said wire guide member, said felt member being formed therein with a central hole slidably receiving said printing wires.

4,687,356

ELECTRONIC PRINTER WITH INTERLEAVED STORAGE OF PRINT WHEEL POSITION, HAMMER INTENSITY, AND CARRIAGE POSITION DATA IN READ ONLY MEMORY

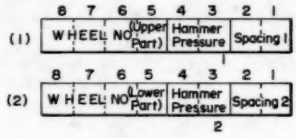
Hirotoshi Matsui, Nara; Takeo Tsumura, Matsubara, and Eiichi Sakanaka, Yamatokoriyama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jun. 26, 1985, Ser. No. 748,985

Claims priority, application Japan, Jul. 2, 1984, 59-137584

Int. Cl.[4] B41J *1/30*

U.S. Cl. 400—144.2 **3 Claims**



1. An electronic printing assembly for sequentially printing characters along a printing row comprising:

a rotary print wheel including a plurality of print types disposed about a circumference of said print wheel;

means, connected to said rotary print wheel, for rotating said wheel to present a desired print type to a printing position adjacent said printing row;

a carriage supporting said means for rotating and said rotary print wheel;

means, connected to said carriage, for shifting said carriage to a desired position along said printing row;

impact means for striking a said type when at said printing position to print a character associated with said type thereat, said impact means applying a variable impact pressure to each said type to apply the optimum pressure to each said type;

means for introducing characters to be printed;

read only memory means for storing position data associated with the print wheel position of the type associated with each character, hammer pressure data associated with the variable impact pressure of each character, and spacing data associated with each character and representing a spacing thereof and thus a shift distance for said carriage in an interleaved fashion, said read only memory means storing said position data, hammer pressure data and spacing data associated with each character in two words with said position data being stored, in part, in both of said words;

wheel control means, responsive to said position data and said hammer pressure data, for controlling said means for rotating to rotate said print wheel to said printing position and for controlling said impact means to vary the impact pressure applied to each said type;

carriage control means, responsive to said spacing data, for controlling said means for shifting to shift said carriage to said desired position adjacent said printing row; and

control means, responsive to said means for introducing, for addressing said read only memory means to access said position data, hammer pressure data and spacing data as information associated with each introduced character and for presenting said information to said wheel control means and said character control means;

said control means for addressing transferring said data from a first one of said two words to said wheel control means and carriage controls means and then subsequently trans-

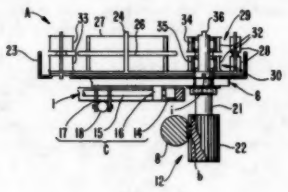
ferring data from said second one of said two words to said wheel control means and carriage control means to substantially simultaneously transfer said position data, hammer pressure data and spacing data associated with a said introduced character to said wheel control means and carriage control means.

4,687,357

INK RIBBON CASSETTE FOR USE IN PRINTER

Koji Katsuragi; Hirofumi Ozaki; Yoshihiro Kawahara; Hideki Matsumoto; Tetsuro Tomoe, and Kazuhiro Kobayashi, all of Osaka, Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Filed Oct. 11, 1985, Ser. No. 786,548
Claims priority, application Japan, Nov. 26, 1984, 59-249145
Int. Cl.[4] B41J *32/00*
U.S. Cl. 400—208 **4 Claims**



1. An ink ribbon cassette for use in a printer of the type including a carriage reciprocal in opposite first and second longitudinal directions and carrying a printing head printing during movement in both said directions, said cassette comprising;

a casing to be removably mounted on the carriage of the printer;

first and second pairs of ink ribbon reels, each said pair comprising an ink ribbon-winding off reel and an ink ribbon-winding up reel having extending therebetween a respective ink ribbon, said pairs of reels being mounted one above the other on said casing with rotation axes of said reels of said first pair coaxially aligned with rotation axes of said reels of said second pair;

a single driving shaft rotatably mounted on said casing and including means for enabling rotation thereof in first and second opposite rotary directions in response to movement of the carriage in respective opposite longitudinal directions;

first one-way clutch means, mounted on said single drive shaft, for transmitting rotation of said drive shaft upon rotation thereof in said first rotary direction and for preventing transmission of rotation of said drive shaft upon rotation thereof in said second rotary direction;

second one-way clutch means, mounted on said single drive shaft, for transmitting rotation of said drive shaft upon rotation thereof in said second rotary direction and for preventing transmission of rotation of said drive shaft upon rotation thereof in said first rotary direction;

said first and second clutch means being coaxially mounted one above the other on said single drive shaft in alignment with respective said first and second pairs of reels;

first conveying means, connected between said first one-way clutch means and said first pair of reels, for conveying said ink ribbon of said first pair of reels between said reels thereof during rotation of said single drive shaft in said first rotary direction, said first conveying means being inoperable during rotation of said single drive shaft in said second rotary direction to prevent conveying of said ink ribbon of said first pair of reels; and

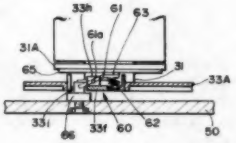
second conveying means, connected between said second one-way clutch means and said second pair of reels, for conveying said ink ribbon of said second pair of reels between said reels thereof during rotation of said single drive shaft in said second rotary direction, said second conveying means being inoperable during rotation of said single drive shaft in said first rotary direction to prevent conveying of said ink ribbon of said second pair of reels;

4,687,358

TRANSFER MATERIAL HOLDING CASSETTE INCLUDING CORE ROTATION INHIBITING MEANS

Masao Saitou, Kamakura, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 14, 1985, Ser. No. 733,927
Claims priority, application Japan, May 15, 1984, 59-99476
Int. Cl.[4] B41J *32/00*
U.S. Cl. 400—208 **14 Claims**



1. A transfer material holding cassette comprising:

a transfer material in a form of a ribbon having one surface coated with a properly selected coloring agent;

first and second cores for receiving and reciprocably displacing said transfer material, said first core winding said transfer material in a first direction and said second core unwinding said transfer material in a second direction opposite said first direction;

a case means for receiving said transfer material and said first and second cores, said case means detachably fittable to a housing of an image building apparatus together with said transfer material and said cores in which a required image is built by transferring coloring agent from said transfer material onto a material to be image transferred; and

a first rotation inhibiting means disposed at a predetermined position corresponding to one of said first and second cores for inhibiting said one core from being rotated freely by exerting a force against said one core in a direction substantially parallel to a rotational axis of said one core at a time before the transfer material holding cassette is fitted to the housing of the image building apparatus and for releasing said one core from an inhibited state when said cassette is fitted to the housing.

4,687,359

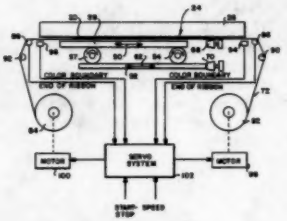
COLOR PRINTER

Gordon B. Barrus, San Juan Capistrano, and Leo J. Emenaker, El Segundo, both of Calif., assignors to Printronix, Inc., Irvine, Calif.

Continuation of Ser. No. 599,062, Apr. 11, 1984, abandoned.
This application Mar. 20, 1986, Ser. No. 843,852
Int. Cl.[4] B41J *33/40, 33/34, 35/18*
U.S. Cl. 400—218 **4 Claims**

1. A method of color printing with an impact printer having at least one impacting element which impacts a ribbon having a plurality of different color zones spaced along the length of the ribbon, comprising the steps of advancing the ribbon relative to the impacting element to impact each of the plurality of different color zones and thereby print in a color contained in the color zone in sequence, and within each of at least some of the color zones reversing the direction of movement of the ribbon at least twice to provide plural passes of each of the at least some of the color zones relative to the at least one impacting element, the step of reversing the direction of movement of the ribbon at least twice within each of at least some of the color zones including the further steps of determining an

amount of printing to be done, advancing substantially the entire length of a color zone relative to the at least one impacting element in a first direction at a nominal speed to provide a first pass, advancing the color zone relative to the at least one impacting element in a second direction opposite the first



direction at the nominal speed by an amount determined by the amount of printing to be done to provide a second pass, and thereafter advancing the color zone relative to the at least one impacting element in the first direction at a speed greater than the nominal speed to an end of the color zone to provide a third pass.

4,687,360

THERMAL IMAGING RIBBON INCLUDING A PARTIALLY CRYSTALLINE POLYMER

Russel E. Wellman, Southbury, and Phyllis A. Cuming, Naugatuck, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Jan. 15, 1986, Ser. No. 818,935

Int. Cl.[4] B41J *31/00*

U.S. Cl. 400—241.1 **18 Claims**

1. A thermal transfer ribbon comprising a substrate and an ink layer, said layer comprising a partially crystalline polymer which becomes soft at a time when the crystalline portion begins to melt, said polymer derived from an acid containing at least one carboxylic acid moiety.

4,687,361

RACK MOUNT FOR A RACK AND PINION CARRIAGE MOVING MECHANISM

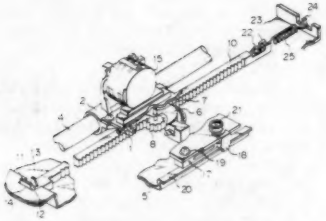
Hiroshi Kikuchi; Kuniharu Hayashi; Minoru Isobe; Jiro Tanuma, and Masanori Maekawa, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Mar. 5, 1986, Ser. No. 836,512

Claims priority, application Japan, Mar. 7, 1985, 60-43619; Mar. 15, 1985, 60-37258[U]

Int. Cl.[4] B41J *19/30*

U.S. Cl. 400—322 **6 Claims**



1. A carriage moving mechanism comprising:

(a) a carriage mounted for movement in a longitudinal direction on a longitudinally extending guide shaft;

(b) a traveling motor fixedly mounted on said carriage, said traveling motor including a pinion mounted on a rotary shaft thereof;

(c) a rack extending substantially in parallel to said guide shaft; said rack being rigid longitudinally and flexible in a flex direction perpendicular to said longitudinal direction, said rack having a longitudinally extending tooth surface engaged with said pinion, another surface of said rack located opposite to said tooth surface being substantially parallel to said guide shaft, said tooth surface and said other surface being spaced apart in said flex direction, said rack having a stop pawl and a stop hole at one longitudinal end thereof;

(d) a roller rotatably mounted on said carriage, said roller radially facing said pinion and making contact with said other surface of said rack so as to resist disengagement of said tooth surface from said pinion;

(e) an elastic member; and

(f) a frame having a projection extending perpendicularly to said longitudinal direction and said flex direction, and a stopper part, said projection projecting through said stop hole, said stop pawl engaging said stopper part, said rack being elastically connected to said frame at an end of said rack opposite said one end through said elastic member so as to elastically resist disengagement of said tooth surface from said pinion, and pivotally connected to said frame at said one end of said projection through said stop hole, such that said rack is pivotable about said projection.

4,687,362

METHOD OF ALIGNING CUT SHEETS IN TYPEWRITERS, OUTPUT PRINTERS OR THE LIKE

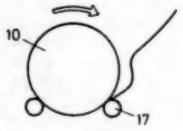
Kurt Rünzi, Küsnachterstr. 59, CH 8126 Zumikon, Switzerland

Division of Ser. No. 716,196, Mar. 26, 1985, Pat. No. 4,620,809. This application Aug. 29, 1986, Ser. No. 902,422

Claims priority, application Switzerland, Apr. 2, 1984, 1665/84

Int. Cl.[4] B41J *13/26*

U.S. Cl. 400—630 **1 Claim**



1. In an office writing machine (**19**) having

a platen (**10**) controllably rotatable in a forward sheet-feeding direction (A) and in a reverse direction (B),

a separating roller (**7,8**) adapted to press against a stack (**2,3**) of copy elements,

a pressure roller (**17**), and

gearing means interconnecting said separating roller (**7,8**) and said platen (**10**),

said pressure roller (**17**) receiving a copy element between the platen and the pressure roller from said stack (**2,3**) of copy elements pressed against said separating roller (**7,8**), said gearing means and said pressure roller (**17**) cooperating to advance to topmost copy element from the stack (**2,3**) upon rotation of the platen (**10**) in the forward direction,

a method of aligning the copy element which comprises the steps of:

rotating the platen in the forward direction until a leading edge of the copy element, fed between the platen and the pressure roller, extends a predetermined length (**88**) beyond a common contact line between the platen (**10**) and the pressure roller (**17**) on a side of said contact line remote from said stack of copy elements;

then rotating the platen in the reverse direction by a path

length which is greater than the angular rotation corresponding to a surface dimension of said predetermined length; and

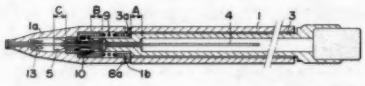
thereafter rotating the platen (10) until the copy element is introduced into the office writing machine for writing thereon.

4,687,363

MECHANICAL PENCIL AND METHOD FOR ASSEMBLING THE SAME

Hidehei Kageyama, Kawagoe, Japan, assignor to Kotobuki & Co., Ltd., Kyoto, Japan

Filed Feb. 21, 1985, Ser. No. 703,921
Claims priority, application Japan, Jun. 8, 1984, 59-116683
Int. Cl.[4] B43K *21/24*
U.S. Cl. 401—65 **4 Claims**



1. A mechanical pencil comprising:

an outer cylinder having a stopper engaging portion;

a lead tank part placed inside said outer cylinder so as to be axially slidable;

a lead chuck fitted to the extreme end of said lead tank part;

a chuck clamp ring disposed in a chuck portion of said lead chuck;

a first sleeve provided with a stopper portion for engaging with the stopper engaging portion of said outer cylinder and loosely fitted to said lead chuck at the rear of said chuck clamp ring; a second sleeve abutting on a rear end portion of said chuck clamp ring and biasing means interposed between said second sleeve and said lead tank part; and

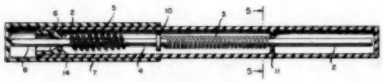
a stopper fitting stepped portion defined on said lead tank part at a position apart from said stopper portion with a distance A said biasing means being compressible through a distance B and said lead chuck being movable a distance C, the distances B and C corresponding to a knocking stroke and the distance A being less than or equal to a knocking stroke.

4,687,364

RETRACTABLE MASCARA APPLICATOR

Ted I. Kingsford, Memphis, Tenn., assignor to Plough, Inc., Memphis, Tenn.

Filed Jul. 17, 1985, Ser. No. 755,758
Int. Cl.[4] B41J *1/54*
U.S. Cl. 401—127 **4 Claims**



1. A mascara applicator device and container comprising:

(a) an elongated reservoir for mascara therein having an opening;

(b) a mascara brush wiper with an orifice in the opening;

(c) a brush mounted on a shaft for movement through the wiper between a position inside of the reservoir and a position outside of the reservoir wherein the shaft is oriented longitudinally by at least one centering ring;

(d) a removable cap adapted to simultaneously close the opening and push the brush to its position inside of the reservoir;

(e) a spring means for pushing the brush to its position outside of the reservoir when the cap is removed; and

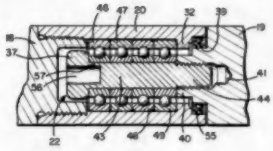
(f) a protrusion from the shaft that is larger than the wiper orifice for preventing the brush from becoming detached from the reservoir when the brush is in its position outside the reservoir.

4,687,365

LOAD LIMITED SWIVEL CONNECTOR

Jon Promersberger, Mankato, Minn., assignor to Condux International, Inc., Mankato, Minn.

Continuation of Ser. No. 709,136, Mar. 7, 1985, abandoned. This application Jul. 2, 1986, Ser. No. 881,498
Int. Cl.[4] F16D *1/12, 9/00*; F16P *5/00*
U.S. Cl. 403—2 **16 Claims**



1. A swivel connector load limited to an approximate calibrated tension load value, comprising:

a first swivel head connectable to a load line;

a second swivel head connectable to another load line;

a breakaway pin having a pin shank, said shank having an external cylindrical surface, a cylindrical body, a threaded end joined to one end of said body, and an annular wall joined to the other end of said body, said body having a tensile strength greater than said calibrated tension load value, a pin head connected to said annular wall remote from said body thereby connecting said shank to said pin head, said pin head having an annular face extended laterally in an outward direction from said external surface of said shank, said pin having an axial bore extended through said pin had into said shank, said annular wall surrounding said bore adjacent said annular face and defined by the diameters of said bore and said external cylindrical surface of said shank, said annular wall having uniform thickness throughout the length thereof and a tensile strength less than said tensile strength of said body of said shank, said thickness of said annular wall having a dimension whereby said tensile strength of said annular wall along the length thereof is generally the same as the approximate calibrated tension load value whereby fracture of said shank at said annular wall will occur upon tension loading between said first and second swivel heads attaining said approximate calibrated tension load value, said second swivel head having a neck, a first shoulder surrounding said neck and an axial threaded bore extended into said neck, said neck having an end, said threaded end of said shank being threaded into said threaded bore, an intermediate tubular body portion having a first end and a second end, said tubular body portion being connected to said first swivel head and surrounding said pin, said first swivel head closing said first end of said tubular body portion, said intermediate tubular body portion having an inwardly directed annular second shoulder located at said second end thereof adjacent said first shoulder, annular seal means located between said first and second shoulders to close said second end of said tubular body, bearing means located between said shank and said intermediate tubular body portion, said bearing means having inner race means retained in engagement with said annular face of said head and said end of the neck of said second swivel head with said pin, an outer race located in engagement with said annular second shoulder, and rotatable means located

between said inner and outer races whereby said first and second swivel heads are rotatable relative to each other about the longitudinal axis of said pin.

4,687,366

CORNER CONNECTING ARRANGEMENT

Olof Wåhlin, Hinsholmsgatan 7, S-421 77 Västra Frölunda, Sweden

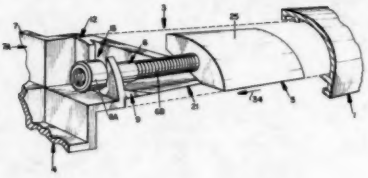
PCT No. PCT/SE85/00086, § 371 Date Nov. 19, 1985, § 102(e) Date Nov. 19, 1985, PCT Pub. No. WO85/04693, PCT Pub. Date Oct. 24, 1985

PCT Filed Feb. 20, 1985, Ser. No. 819,886

Claims priority, application Sweden, Apr. 11, 1984, 8402004

Int. Cl.[4] F16B *7/00*

U.S. Cl. 403—297 **5 Claims**



1. A connection piece for releasably connecting profile elements having internal cavities at an angle to each other, said piece comprising an intermediate part, at least two projections extending from said part, each projection having a sloping surface, each projection extending from a respective wall element of said intermediate part, an aperture in each wall element, a wedge element associated with each projection and having a sloping surface complementarily formed to the sloping surface of said projection, and a screw device extending through said aperture and threadedly engaged with said wedge element, whereby when said screw device is operated to work with sloping surfaces against each other, the wedge element is forced against internal walls of the profile element to releasably secure said profile element to said intermediate part, wherein said aperture comprises a slit which extends through said wall element disposed transverse to the longitudinal extent of the projection, and which is arranged on the respective sides to receive a main part and the threaded part, respectively, of the screw device.

4,687,367

DEVICE FOR MANEUVERING FAST CONNECTION TANGENTIAL BUTTON OPERATED OF SPLINED PROFILE CLUTCHES, ESPECIALLY ON END FORKS OF AGRICULTURE CARDANIC SHAFTS

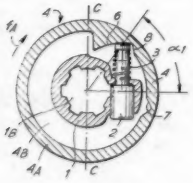
Edi Bondioli, Via Gina Bianchi 18, 46029 Suzzara Mantova, Italy

Filed May 8, 1986, Ser. No. 861,226

Claims priority, application Italy, May 10, 1985, 9406 A/85

Int. Cl.[4] B25G *3/18;* **F16B** *21/00*

U.S. Cl. 403—322 **3 Claims**



1. A device for maneuvering a fast connection tagential button operated, in a transmission including a splined clutch, comprising a fork body having a radially extended arm, a button cylinder supported on said arm, said button cylinder being slightly inset in said arm and projecting out of said arm, an annular sleeve member encircling said fork body and having an inner profile making up a thrust surface able to act on said button cylinder as a consequence of an angular displacement of said annular member around said fork body, a biasing spring acting on said button cylinder urging said annular member in a direction opposite to that causing a release action on said button cylinder, said annular member forming a stop located so as to engage the terminal end of said button cylinder opposite from said thrust surface to limit the travel of said button cylinder, said annular member having a cylindrical skirt portion with an inner radial extension which makes up its rotation support on said fork body and having a rotation seat for said radial tension member; and a plate member in the form of a ring for retaining said radial extension member.

4,687,368

THREAD STRUCTURE FOR PERCUSSION ROCK DRILLING

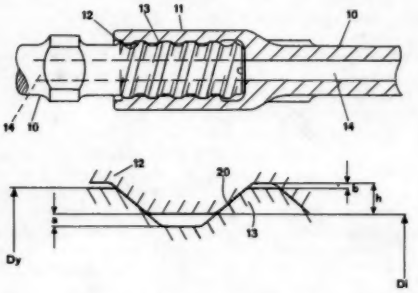
Åke T. Eklof, Skarholmen, and Harry A. I. Wiredal, Sandviken, both of Sweden, assignors to Santrade Limited, Lucerne, Switzerland

Filed Apr. 3, 1986, Ser. No. 847,707

Claims priority, application Sweden, Apr. 4, 1985, 8501699

Int. Cl.[4] F16B *7/00*

U.S. Cl. 403—343 **7 Claims**



1. A percussion drill string comprising a first element having an interior cylindrical thread and a second element having an exterior cylindrical thread, said threads including mutually abutting flanks which are straight along their abutting contact portions as viewed in longitudinal section, a first clearance provided between a bottom portion of the exterior thread and a crest portion of the interior thread which is at least four times as large as a second clearance between a bottom portion of the interior thread and a crest portion of the exterior thread, said first clearance being larger than one percent of the outer diameter of the exterior thread as measured from crest-to-crest.

4,687,369

TRAFFIC FLOW INDICATOR FOR ROADWAY PLACEMENT

Gerald R. McDonald, 40960 McKenzie Hwy., Springfield, Oreg. 97478

Continuation-in-part of Ser. No. 739,318, May 30, 1985, abandoned, which is a continuation-in-part of Ser. No. 644,623, Aug. 27, 1984, abandoned. This application Jun. 9, 1986, Ser. No. 871,926

Int. Cl.[4] E01F *9/06*

U.S. Cl. 404—12 **7 Claims**

1. A highway traffic lane marker for temporary placement on a roadway surface to indicate traffic flow around an obstruction, said marker comprising,

a main body portion of elongate shape,

a head portion of generally triangular shape and having one side in abutment with one end of said main body portion, said main body portion and said head portion both including

coupling means joining said main body portion to said head portion, and

said main body portion including additional coupling means disposed at the remaining end of the main body portion.

4,687,370

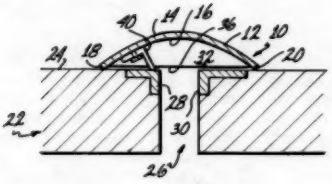
REMOVABLE SPEEDBUMP-COVER

Larry F. Knowles, 835 Milwood Ave., Venice, Calif. 90292

Filed Nov. 24, 1986, Ser. No. 934,204

Int. Cl.[4] E01F *13/00*

U.S. Cl. 404—15 **11 Claims**



1. An elongated structural member for mounting on a surface of a vehicular driveway transverse to the normal path of vehicular travel comprising:

a laterally arcuate elongated panel having an elongated convex side, an elongated concave side, a first elongated edge and a second elongated edge, said first and second edges being adapted to support said panel on said vehicular driveway, said convex side adapted to being positioned to be contacted by vehicular traffic passing over said driveway, and said concave side being adapted to be positioned facing the surface of said driveway;

means for supporting a load on the convex side of said panel including at least one gusset member extending generally transversely of said concave side, said gusset member terminating in a normally downwardly facing support edge, said gusset member normally extending from said concave side toward but not to a plane defined by said first and second edges so as to permit said panel to flex and to conform to an irregular driveway surface; and

means for mounting said panel to said driveway including fastening means actuatable from said convex side for removably securing said panel to said driveway.

4,687,371

PRECAST CONCRETE CULVERT SECTION

William D. Lockwood, Dayton, Ohio, assignor to Con/Span Culvert Systems, Inc., Kettering, Ohio

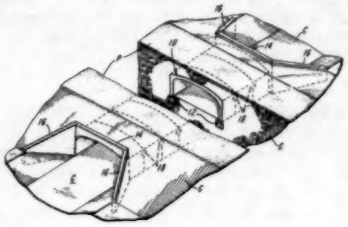
Continuation of Ser. No. 566,438, Dec. 28, 1983, Pat. No. 4,595,314. This application Apr. 17, 1986, Ser. No. 853,206

The portion of the term of this patent subsequent to Jun. 17, 2003, has been disclaimed.

Int. Cl.[4] E01F *5/00*

U.S. Cl. 405—125 **12 Claims**

1. A concrete culvert assembly comprising a set of parallel spaced elongated footers, a plurality of precast concrete culvert sections mounted on said footers in longitudinal alignment, each of said culvert sections having an open bottom and including parallel spaced vertical side walls having bottom surfaces resting on said footers, an arcuate concrete top wall integrally connecting said side walls of each said section, said side walls of each said section having opposing inner surfaces defining a span greater than the length of said side and top walls, said arcuate top wall of each section having a generally uniform thickness with a curved inner surface having a radius of curvature at least twice the rise defined between the top center of said curved inner surface and said bottom surfaces of said side walls, each of said side walls of each said section having a generally uniform thickness and a flat vertical outer surface with a vertical height at least sixty percent of said rise



and less than fifty percent of said radius of curvature, said concrete top wall of each said section having a curved outer surface forming a relatively sharp corner with said outer surface of each said side wall, reinforcing members embedded in said concrete of each said section and extending generally parallel to said outer surfaces of said top and side walls, and said inner surface of each said side wall and said inner surface of said top wall of each said section being connected by a surface cooperating with said relatively sharp corner to define a corner thickness substantially greater than the uniform thickness of said side and top walls.

4,687,372

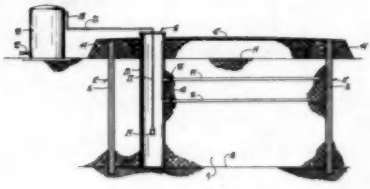
TOXIC WASTE DRAIN SYSTEM AND METHOD

Ken O. Thornton, 215 E. Grimes St., Polk City, Iowa 50226

Filed Jan. 27, 1986, Ser. No. 823,044

Int. Cl.[4] B09B *1/00;* **E02D** *5/18;* **E02B** *11/00*

U.S. Cl. 405—128 **14 Claims**



1. A method of containing and storing existing toxic waste dump sites, to prevent leakage and seepage of toxic waste from existing pit-type dump sites into the surrounding area, without disturbing the existing toxic waste site of said site said method comprising:

ascertaining from the soil vertical and horizontal hydraulic conductivity a moisture imperious layer depth for the soil surrounding the site;

digging a perimeter trench around the dump site to a depth at least equal to the depth of soil moisture impervious layer;

filling said trench with a substantially moisture impervious material to provide a moisture barrier perimetrically around the outside of said site;

placing a well hole within the area defined by said perimeter trench adjacent said site;

placing a drain line below said site and above the moisture impervious layer, said drain line being in fluid communication with said well hole; and

providing in said well hole a pump and storage means in communications with said drain line.

4,687,373

COMPOSITION TO ENCAPSULATE TOXIC METAL AND/OR ORGANIC POLLUTANTS FROM WASTES

Charles D. Falk, Marlboro, and Lincoln R. Davis, Lincroft, both of N.J., assignors to Lopat Industries, Inc., Wanamassa, N.J.

Continuation-in-part of Ser. No. 865,427, May 21, 1986, abandoned. This application Aug. 29, 1986, Ser. No. 902,204

Int. Cl.[4] C02F *1/52*

U.S. Cl. 405—128 **13 Claims**

1. A composition for encapsulating solid waste or sludge comprising:

an aqueous silicate solution in an amount between about 0.05 and 5 weight percent, said silicate solution comprising between about 5 and 15 percent potassium oxide and between about 10 and 30 percent silicon dioxide; and

a fixative in an amount between about 5 and 100 weight percent, said fixative comprising a substantial portion of calcium oxide, wherein the weight percents are based on the waste or sludge being treated.

4,687,374

METHOD OF AND APPARATUS FOR CONCRETE TUNNEL LINING

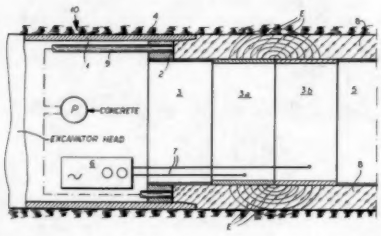
Siegmund Babendererde, Bad Vilbel; Bernd Hillemeier, Wiesbaden, and Otto Braach, Hattingen, all of Fed. Rep. of Germany, assignors to Hochtief Aktiengesellschaft Vorm. Gebr. Helfmann, Essen, Fed. Rep. of Germany

Filed Mar. 13, 1986, Ser. No. 839,791

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1985, 3508966

Int. Cl.[4] E21D *9/06, 11/10*

U.S. Cl. 405—146 **6 Claims**



1. A process for making a tunnel lining from concrete in a single operation with a tunnel escavator, a tunnel lining circular space being provided with the help of a tunnel form consisting of a plurality of tunnel form segments, said tunnel lining circular space being closed by a form front end adjacent said tunnel excavator and at a rear end of said tunnel form by said concrete which has already hardened, said process comprising:

(a) pumping said concrete into said space in fluid form through a pipe through said form front,

(b) accelerating the hardening of said concrete by heating it as it passes through a section of said pipe before it enters said space dielectrically with electromgnetic radiation, and

(c) repositioning said tunnel form segments following said tunnel excavator after hardening of said concrete to a strength which is sufficient.

4,687,375

CIRCULAR HEADING MACHINE

Arthur Gill, Dunblane, United Kingdom, assignor to Anderson Strathclyde PLC, Glasgow, Scotland

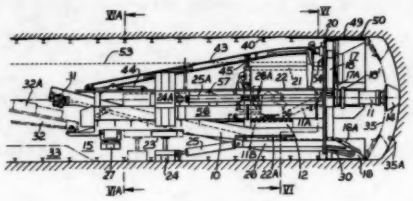
PCT No. PCT/GB84/00285, § 371 Date Apr. 25, 1985, § 102(e) Date Apr. 25, 1985, PCT Pub. No. WO85/01081, PCT Pub. Date Mar. 14, 1985

PCT Filed Aug. 17, 1984, Ser. No. 729,731

Claims priority, application United Kingdom, Aug. 20, 1983, 8322468

Int. Cl.[4] E21D *9/08, 11/40*; E21C *29/02*

U.S. Cl. 405—146 **7 Claims**



1. A circular heading machine comprising: an elongate machine body, means to advance said body in stepwise fashion, a carriage mounted on top of the machine body and slidably moveable thereon longitudinally and independently of the stepwise movement of the machine body, a forwardly directed cutter boom mounted on the sliding carriage and manually controlled from an operative position on the sliding carriage, a cage structure surrounding the sliding carriage, and means for erecting tunnel support structures over the machine body, the erecting means being provided externally of the cage structure whereby the cutter boom operative can operate the cutter boom during erection of the tunnel support structures so that erection of the tunnel support structures and operation of the cutter can take place simultaneously as the machine advances in stepwise fashion.

4,687,376

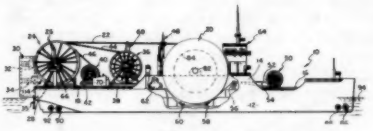
MULTI-REEL OPERATIONAL LINES LAYING VESSEL

Carlos E. Recalde, Irvine, Calif., assignor to Santa Fe International Corporation, Alhambra, Calif.

Filed Aug. 31, 1984, Ser. No. 646,112

Int. Cl.[4] F16L *1/04*; B63B *35/04*

U.S. Cl. 405—168 **45 Claims**



1. A reel pipelaying vessel for use in a body of water, comprising at least two reels mounted thereon for storage and layout of at least two operational lines at least one of which is a rigid walled pipeline;

an operation lines laying device mounted adjacent the stern of said vessel downstream of said reels in the direction of unspooling;

said laying device including a drum mounted on said vessel for rotation about an axis transverse to the longitudinal axis of said vessel, and adapted for providing simultaneous moving contact for each of a plurality of operational lines;

with said plurality of lines interconnected to one another and adapted for moving at a common velocity with respect to each other and for permitting layout from said vessel in a downward juxtaposed configuration;

a pipe take off structure pivotally mounted on said drum axis

of rotation and incuding first straightener means for applying a force on the operational lines inward toward said drum axis and second straightener means for applying a force on the operational lines outward away from said drum axis, with said drum and first and second straightener means providing three point straightening to the operational lines as the operational lines leave said drum; and

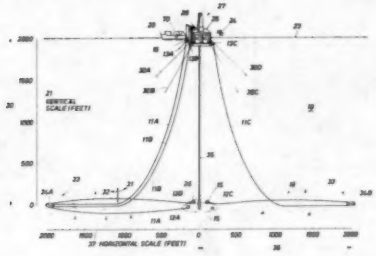
motive means operatively interconnected to said reels and adapted to control the rate of layout of the operational lines therefrom.

4,687,377

METHOD AND APPARATUS FOR SUBSEA FLEXIBLE CONDUIT INSTALLATION

Carl G. Langner, Spring, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Jan. 23, 1986, Ser. No. 821,923
Int. Cl.[4] F16L *1/04*
U.S. Cl. 405—169 **22 Claims**



1. A method of connecting a flexible conduit having a first end and a second end between a first connection means and a second connection means, said first connection means located adjacent the bottom of a body of water, said second connection means located adjacent the surface of said body of water and being capable of movement relative to said first connection means, said method comprising:

installing anchor block means on the bottom of said body of water;

connecting one of said ends of said conduit to one of said connection means;

operatively looping a portion of said conduit about said anchor block means; and

connecting the other of said ends of said conduit to the other of said connection means, thereby connecting said flexible conduit between said first connection means and said second connection means.

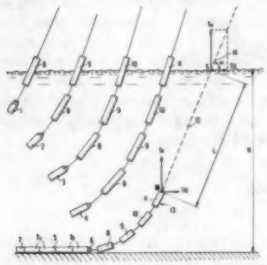
4,687,378

TEMPORARILY TERMINATING LAYING OF UNDERWATER PIPE LINE

Michel Jegousse, Saint Herblain, and Yves Le Hir, Nantes, both of France, assignors to Compagnie Francaise des Petroles, France

Filed Apr. 3, 1981, Ser. No. 250,787
Claims priority, application France, Apr. 4, 1980, 80 07686
Int. Cl.[4] F16L *1/04*
U.S. Cl. 405—171 **4 Claims**

1. A process for the setting-down of a pipe in the sea by means of a setting-down line, the pipe having a free end to which is fixed a water-tight traction head, said line being joined at its lower end to the water-tight traction head and at its upper end to a tensioning device carried by a vessel at the sea's surface so that an upper portion of the line is straight and forms an angle of general inclination with the vertical during the lowering of the pipe, said process being characterized by the improvement comprising: providing the line with a lower portion shorter than the upper portion; and tensioning the setting-down line by placing sinkers at only said lower portion of the setting-down line, thereby reducing the angle of general



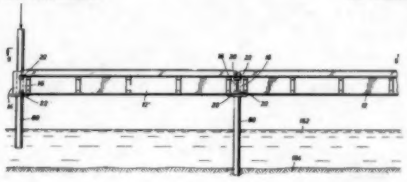
inclination which the straight upper portion of the setting-down line forms with the vertical during the lowering of the pipe and, thus, reducing the length of the line.

4,687,379

METHOD AND APPARATUS FOR CONSTRUCTING ELEVATED STRUCTURES

Alces P. Robishaw, 9333 Memorial #210, Houston, Tex. 77024

Division of Ser. No. 704,500, Feb. 22, 1985, Pat. No. 4,647,257.
This application Feb. 9, 1986, Ser. No. 903,295
Int. Cl.[4] E02B *17/00*
U.S. Cl. 405—195 **23 Claims**



1. A construction system comprising:

a plurality of longitudinal construction components each comprising a girder, said girders having primary locking means on their ends for locking said girders together in end-to-end relation;

some of said primary locking means being primary male locks each of which comprises—

an elongate connector member having a shank and a head rigidly carried on one end of said shank, said head having first and second transverse dimensions measured in perpendicular directions, said first transverse dimension being substantially greater than said second transverse dimension and further being substantially greater than the transverse dimension of said shank measured parallel to said first transverse dimension,

a carrier member rigidly adjoined to such end of one of said girders and having a front face facing outwardly endwise of said one girder, a rear face at the opposite end from said front face, and a carrier bore extending therethrough from front to rear and receiving said connector member for longitudinal reciprocation, and

securing means selectively interengageable between said connector member and said carrier member to limit forward movement of said connector member with respect to said carrier member;

and others of said primary locking means being primary female locks each of which comprises—

a receiving member rigidly adjoined to such end of another of said girders and having a front face facing

outwardly endwise of said other girder, a rear face at the opposite end from said front face, and a receiving bore extending there-through from front to rear, said receiving bore having first and second transverse dimensions measured in perpendicular directions, said first transverse dimension of said receiving bore being greater than said first transverse dimension of said head, and said second transverse dimension of said receiving bore being greater than said second transverse dimension of said head but less than said first transverse dimension of said head.

4,687,380

TOWER STRUCTURE AND METHODS OF FABRICATING SUCH A STRUCTURE

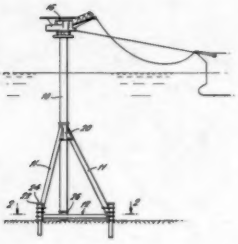
Jan Meek, Gouda, and Kees Willemse, Leiden, both of Netherlands, assignors to Heerema Engineering Service BV, Leiden, Netherlands

Continuation-in-part of Ser. No. 590,145, Mar. 16, 1984, abandoned. This application May 30, 1986, Ser. No. 868,689

Claims priority, application United Kingdom, Mar. 18, 1983, 8307640

Int. Cl.[4] E02D *17/00*

U.S. Cl. 405—204 **14 Claims**



1. An offshore tower structure of the kind adapted to be erected in a body of water and comprising.

a central column,

a base unit to support the column on the sea bed and to which the column can be attached offshore,

a platform to be attached to the upper end of the column and be supported thereby, the column being able to carry conductors, risers and the like between the sea bed and the platform,

the base unit comprising a base structure to rest on and be anchorable to the sea bed and a plurality of legs which are attachable at their lower ends to the base structure at horizontally spaced locations and which are attachable at their upper ends to the column at a position intermediate the ends of the column, the legs extending upwardly and inwardly from the base structure to the column, wherein

the base unit is constructed as an integral preformed structure with a column receiving sleeve attached to the upper ends of the legs and with means for locating the lower end of the column laterally with respect to the base structure,

the column being connectable to the base unit by slidingly engaging the column within the sleeve of the base unit, locating the lower end of the column by the locating means and attaching the column to the base unit by rigid connection means between the column and the sleeve, the arrangement being such that in the assembled structure the primary load transfer between the column and the sea bed is through the column and sleeve connection, to the legs, to the base structure and hence to the sea bed.

4,687,381

DEVICE FOR INTRODUCING A POWDER WITH CATALYTIC ACTIVITY INTO A FLUIDIZED-BED POLYMERIZATION REACTOR

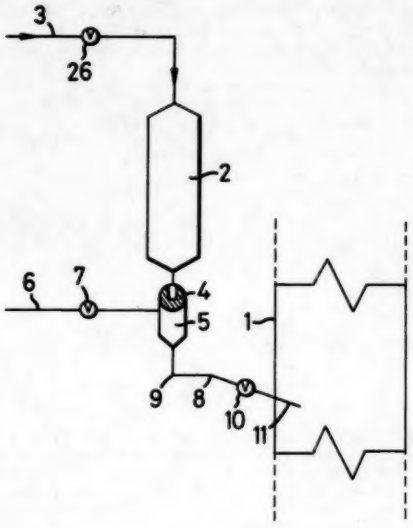
André Dumain, Martigues, and Charles Raufast, Saint Julien les Martigues, both of France, assignors to BP Chemicals Limited, London, England

Filed Mar. 26, 1985, Ser. No. 716,030

Claims priority, application France, Mar. 30, 1984, 84 04985

Int. Cl.[4] B65G *53/40*

U.S. Cl. 406—52 **8 Claims**



1. Device for introducing a catalytically active powder into a fluidized bed reactor for polymerization or copolymerization of gaseous alpha olefins, the said device being characterized in that it comprises

a storage enclosure for catalytically active powder adapted to feed the powder to a metering device, the metering device being capable of communicating sequentially with the storage enclosure and with an intermediate chamber and permitting periodic delivery into this chamber of a metered volume of the powder,

the intermediate chamber being placed below the metering device to receive direct the powder delivered by the latter, the said intermediate chamber having a capacity of at least 1.1 times the volume of powder periodically delivered by the metering device,

a supply tube for inert carrier gas connected to the intermediate chamber, the said tube leading into the top half of the intermediate chamber, the tube being provided with a rapid opening shut-off valve,

powder conveyor piping having an internal diameter between 6 and 60 mm connecting the base of the intermediate chamber to the fluidised bed reactor, the said pipe having a horizontal portion or a portion deviating from the horizontal by not more than 30° and an elbow which is situated between the outlet of the intermediate chamber and the portion of the pipe which is horizontal or which deviates from the horizontal by not more than 30°, and being provided with a full bore rapid opening valve situated near to the fluidized bed reactor.

4,687,382

SYSTEM FOR CONTROLLING SOLID TRANSPORT

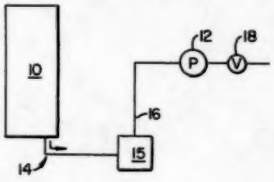
David S. Smith, San Rafael, Calif., assignor to Chevron Research Corporation, San Francisco, Calif.

Division of Ser. No. 677,640, Dec. 4, 1984, abandoned. This application Sep. 5, 1986, Ser. No. 904,131

The portion of the term of this patent subsequent to Aug. 11, 2004, has been disclaimed.

Int. Cl.[4] B65G *53/30*

U.S. Cl. 406—168 7 Claims



6. An apparatus for controlling the flow of solid particles which are slurried with a liquid, which apparatus comprises:

(a) an L-valve; and

(b) a means for controlling liquid pressure on said solid particles in the L-valve.

4,687,383

INSERT ROTARY CUTTER

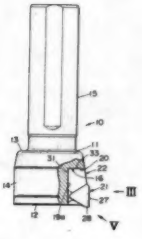
Hiroshi Shimomura, Nakano, and Tatsuo Arai, Kitamoto, both of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 28, 1986, Ser. No. 845,866

Claims priority, application Japan, Mar. 30, 1985, 60-67203; Aug. 7, 1985, 60-123894

Int. Cl.[4] B23C *5/22*

U.S. Cl. 407—46 3 Claims



1. An insert rotary cutter comprising:

(a) a cutter body having an axis of rotation therethrough and a plurality of pockets formed in one end thereof in circumferentially distributed relation;

(b) a plurality of support members of cemented carbide attached respectively to said pockets, each support member having a front face, a rear face and a recess formed in the front face thereof, said recess being open radially and axially outwardly of the cutter body and having a bottom face;

(c) a plurality of cutter inserts each comprising a polygonally shaped plate defined by a front face, a rear face and a plurality of side faces, each cutter insert being received in a respective one of said recesses of the said support member with the rear face of the insert held in contact with the bottom face of the recess so as to have a positive rake in the radial and axial directions; and

(d) a plurality of clamp means to respectively clamp said cutter inserts to said cutter body through said support members;

the depth of each said recess being one third to two thirds of a thickness of a said respective cutter insert, the thickness of said respective support member between said bottom face of said respective recess and said rear face of the support member being not less than three times the depth of said respective recess, said respective recess having at least one side wall disposed generally perpendicularly to said bottom face, said side wall of said respective recess having a positioning surface with which one of said side faces of said cutter insert is held in abutment for positioning the cutter insert, an edge portion defined by said positioning surface of said respective recess and said front face of said support member being removed.

4,687,384

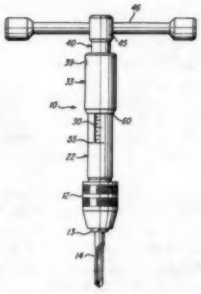
HAND TAPPING DEVICE

David A. McCoy, 3912 Eileen Rd., Dayton, Ohio 45429

Filed Dec. 18, 1985, Ser. No. 810,406

Int. Cl.[4] B23G *1/28*

U.S. Cl. 408—16 3 Claims

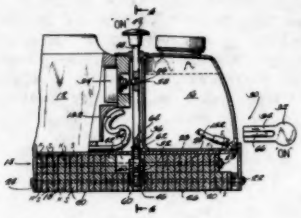


1. A hand operated tap wrench adapted to receive a tap for cutting threads within a bore in a workpiece, the device comprising a tubular housing having first and second end portions, a chuck secured to the first end portion and having means for releasably gripping the tap, a drive rod extending axially into the second end portion of the tubular housing and disposed for axial sliding movement within the second end portion, means for limiting axial movement of the drive rod within the housing and effective to rotate the housing in response to rotation of the drive rod, a compression spring within the housing and extending between the chuck and the drive rod, a tubular sleeve having a portion mounted on the drive rod and slidably receiving the second end portion of the housing, means for securing the sleeve to the drive rod for rotation with the drive rod and the housing, the housing being movable between a retracted position within the sleeve and a normally extended position projecting from the sleeve, a handle rod secured to the drive rod and extending perpendicular to the drive rod, the handle rod being effective to rotate the drive rod, housing and the sleeve after the drive rod is compressed within the housing against the spring, the tap being effective to cut threads within the bore as the housing slides outwardly on the drive rod and within the sleeve in response to a torque applied to the drive rod by the handle rod and to the force exerted by the spring, the housing having an outer surface with an axially extending graduated scale, and the scale being exposed as the housing moves to its extended position to exhibit on the scale the corresponding depth of the tap within the bore.

4,687,385
PORTABLE HOLE CUTTING POWER TOOL

Bernhard Palm, Brookfield, Wis., assignor to Milwaukee Electric Tool Corporation, Brookfield, Wis.

Filed Apr. 8, 1985, Ser. No. 720,860
Int. Cl.[4] B23B *45/14*
U.S. Cl. 408—76 **6 Claims**



1. A portable power tool having a magnetic base incorporating permanent magnets to hold the tool on ferromagnetic material;

means for enabling and disabling the magnetic field of said magnetic base,

a housing fixed on said base,

a rotatable, axially fixed spindle mounted in said housing,

an electric motor mounted in said housing and driving said spindle,

a cutting tool mounted on said spindle for axial movement relative to the spindle,

means controlling axial movement of said cutting tool to and from the material to be cut,

said magnetic base including a fixed assembly of permanent magnets separated by ferromagnetic plates,

said means enabling and disabling the magnetic field comprising a moveable assembly of permanent magnets separated by ferromagnetic plates and slideable on said fixed assembly between positions of reinforcing and shunting the field of said fixed assembly, said moveable assembly having fewer magnets than the fixed assembly so the base always has a magnetic field effective,

a switch controlling operation of said motor,

means preventing closure of said switch when said moveable assembly is in said field shunting position,

a rod operatively connected to said switch and slideably mounted in said housing and said base,

stop means fixed on said rod,

said moveable assembly of magnets including a blocking surface engaged by said stop means when said moveable assembly is in said field shunting position,

said moveable assembly including a relief aligned with said stop means when said moveable assembly is in said reinforcing position and enabling said rod to be actuated to close said switch as said stop means enters said relief.

4,687,386
APPARATUS FOR PERFORMING MACHINING OPERATIONS IN POORLY ACCESSIBLE LOCATIONS

Hans G. Mayer, Telemastr. 5, 2000 Hamburg 19, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 440,438, Nov. 9, 1982, abandoned. This application May 16, 1985, Ser. No. 734,733
Claims priority, application Fed. Rep. of Germany, Nov. 11, 1981, 31329[U]
Int. Cl.[4] B23B *39/00*
U.S. Cl. 408—88 **13 Claims**

1. An apparatus for performing machinery operations on a work surface within a niche or crevice constituting a poorly accessible location, comprising

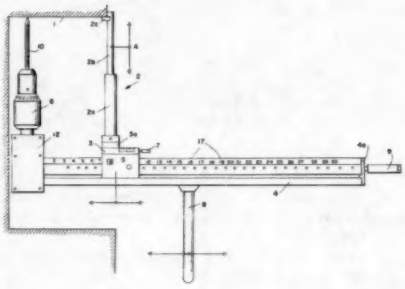
a fastening head for receiving a machining tool for rotation about a first axis;

a drive shaft having a second axis located at a right angle from said first axis, said drive shaft having a distal end which is fastenable to a drive machine;

bevel gear means for rotatably connecting said fastening head to said drive shaft;

a longitudinal housing for said drive shaft extending along the axial length of said drive shaft and providing guiding means therefor;

a spring urged telescopic guide extending from said longitudinal housing at a right angle from said drive shaft, said telescoping guide telescoping in a direction along said first axis, said telescopic guide having a distal end;



means for displaceably mounting said telescopic guide on said housing and for fixedly locating said telescopic guide at a selected location along the length of said housing from said fastening head; and

support means, located at said distal end of said telescopic guide, for abuttingly bracing said apparatus against the work surface to be machined without attachment thereto,

wherein said telescoping of said telescopic guide allows advancement of the apparatus in the direction of said first axis as said work surface is machined by said machining tool.

4,687,387
CUTTING TOOL

Aage V. Roos, Skärplinge, Sweden, assignor to Santrade Limited, Lucerne, Switzerland

Filed Jun. 16, 1986, Ser. No. 874,680
Claims priority, application Sweden, Jun. 17, 1985, 8502979
Int. Cl.[4] B23B *51/02*; B23C *5/18*
U.S. Cl. 408—144 **11 Claims**

1. A cutting tool comprising:

a tool body including a shank rotatable about a longitudinal axis;

at least one chip gullet formed in said shank;

at least one insert-receiving site arranged in a forward working end of the shank;

said insert-receiving site including a longitudinally forwardly facing support surface and a circumferentially facing support surface extending forwardly from said forwardly facing support surface, and

cutting means comprising at least first and second cutting inserts seated on said forwardly facing support surface, said first insert disposed radially inside of said second insert and formed of a softer material than said second insert, said first insert including a first cutting edge and a first side surface intersecting said first cutting edge; said second insert including a second cutting edge, a second side surface intersecting said second cutting edge, and a circumferentially facing supporting surface;

said circumferentially facing supporting surface bonded to said circumferentially facing support surface of said shank,

said first and second side surfaces facing and abutting one another such that said first and second cutting edges are substantially continuously arranged,

each of said first and second side surfaces oriented at an acute angle relative to said circumferentially facing supporting surface and said circumferentially facing support surface such that said first side surface imparts a force to said second insert urging said circumferentially facing supporting surface against said circumferentially facing support surface.

4,687,388

DRILL BIT

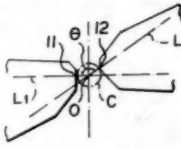
Yuzo Yokota, and Atsushi Endo, both of Kanagawa, Japan, assignors to Toshiba Tungaloy Co., Ltd., Japan

Filed May 22, 1986, Ser. No. 866,076

Claims priority, application Japan, May 24, 1985, 60-111396

Int. Cl.[4] B23B *51/02*

U.S. Cl. 408—230 **6 Claims**



1. A drill bit comprising a drill body and a pair of cutting edges provided on one end of the drill body, wherein said pair of cutting edges are substantially radially opposed to one another across the axis of rotation of the drill bit, said cutting edges being spaced apart from one another to form a gap therebetween about the axis of rotation of said drill bit and to prevent core formation and deposition at the bottom of a hole being drilled, said cutting edges being configured such that line segments connecting innermost points of the cutting edges and the axis of rotation of said drill bit form an angle not larger than about 160°.

4,687,389

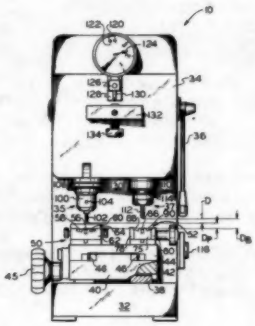
KEY DUPLICATION MACHINE

Robert J. Santii, Milldale, and Raymond Aldieri, Plantsville, both of Conn., assignors to Lori Corporation, Southington, Conn.

Filed Apr. 14, 1986, Ser. No. 851,978

Int. Cl.[4] B23C *3/35*

U.S. Cl. 409—81 **23 Claims**



1. Apparatus for the formation of keys from key blanks comprising:

a movable table;

receiver means mounted on said table for supporting a key to be duplicated, the key having a blade with a bit pattern defined by a plurality of regions from which material has been removed, said receiver means supporting the key in at least a first orientation;

template means for defining the correct location of regions which may comprise the bit pattern of the key to be formed, said template means being mountable on said table in registration with said receiver means;

vise means mounted on said table for receiving and supporting a key blank, the key blank including a blade portion having a size and shape commensurate with the size and shape of the blade of the key to be formed, the key blank being supported so as to be oriented parallelly with respect to a key supported by said receiver means;

locator means, said locator means and said table being relatively movable to align said locator means with said template means, said locator means including a sensor member which is reciprocally movable with respect to said receiver means independently of said relative motion whereby contact may be established between said sensor member and a bit pattern defining region on the blade of a key supported by said receiver means, said sensor member being guided into contact with a supported key by said template means;

indicator means coupled to said locator means for indicating the depth of pattern bit defining regions of the blade of a key supported by said receiver means which are contacted by said sensor member;

cutter means for selectively removing material from a key blank supported in said vise means, said cutter means being reciprocally movable relative to said vise means and being coupled to said indicator means, said cutter means being registrable with said vise means, said cutter means and said locator means sensor member being initially positioned with different pre-established spacings from said table; and

actuator means for imparting motion to said locator means sensor member and to said cutter means whereby material may be removed from the blade of a key blank supported in said vise means at locations determined by said template means and the amount of material removed at each location may be a function of the depth indication provided by

said indicator means, said actuator means including lost motion means so that in a locator mode the locator means sensor member may be seated in a pattern defining region of a key supported by said receiver means and said cutter means will be out of engagement with the key blank, and in a cutting mode the locator means sensor member may be seated in a pattern bit defining region of the blade of a key supported by said receiver means and the cutting means will engage the key blank.

4,687,390

ENGRAVING APPARATUS HAVING IMPROVED BEARING AND PATTERN

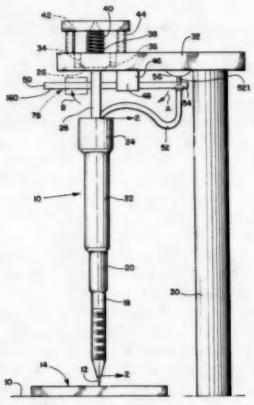
Philip L. Samis, 1 Place Ville Marie, Suite 1521, Montreal, H3B 2B5, Canada

Continuation-in-part of Ser. No. 384,108, Jun. 1, 1982, Pat. No. 4,591,304, and a continuation-in-part of Ser. No. 189,022, Sep. 22, 1980, Pat. No. 4,406,567. This application Jun. 23, 1983, Ser. No. 507,161

The portion of the term of this patent subsequent to Sep. 27, 2000, has been disclaimed.

Int. Cl.[4] **B23Q** *35/10*; **B43L** *13/10*

U.S. Cl. 409—92 **29 Claims**



1. In apparatus for scribe engraving a workpiece with a miniature representation of a pattern in response to movement of a stylus following said pattern, including:

(a) a spherically rotatable member;

(b) means for connecting said scribe with said spherically rotatable member for effecting motion of said scribe with said rotatable member as said rotatable member rotates;

(c) means for connecting said rotatable member with said stylus for effecting rotatable member rotation in response to stylus movement following said pattern, including:

(1) a housing member for retaining said stylus and adapted to permit stylus movement with respect thereto;

(2) means for biasing said stylus outwardly of said housing member towards said pattern;

the improvement comprising:

(d) a spherically curved bearing race;

(e) said rotatable member including a spherically curved surface portion rotatably retained within said race;

(f) means for selectably releasing said connecting member from said rotatable member;

(g) said scribe extending to a position, intermediate a center of rotation of said rotatable member and said stylus, to contact said workpiece.

4,687,391

MILLING MACHINE HEAD ASSEMBLY

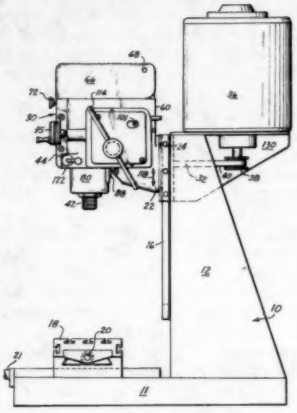
Arthur J. Pretty, 500 Cagney La., #115, Newport Beach, Calif. 92663

Filed Mar. 22, 1985, Ser. No. 714,938

Claims priority, application United Kingdom, Apr. 19, 1984, 8410257

Int. Cl.[4] **B23Q** *1/12*

U.S. Cl. 409—201 **18 Claims**



1. A milling machine head assembly, comprising in combination:

a milling machine head;

means including a movable carriage for mounting said machine head for movement with said carriage;

means for mounting said machine head on one side of said carriage for angular movement of said machine head relative to said carriage about a predetermined axis, said means for mounting said machine head include a slide guide for slidably mounting said carriage, and means for mounting said slide guide in an upright position, whereby said machine head and motor are vertically adjustable, and means for clamping the machine head in any adjusted position on the slide guide;

means on an opposite side of said carriage for mounting a motor on said opposite side of the carriage for movement with said carriage independently of said angular movement of the machine head relative to said carriage;

means for transmitting drive power to the machine head in any angular position of said machine head within said angular movement, including a power transmission twistable relative to the motor and to said predetermined axis and extending along said predetermined axis through said carriage from said motor on said opposite side of the carriage to the machine head on said one side of the carriage, said power transmission includes an endless belt and means for mounting said endless belt in a loop extending through said carriage from said opposite side to said one side of the carriage along, and twistable relative to, said predetermined axis.

4,687,392

TORQUE LIMITING FASTENER

Robert E. Bidwell, 27 Montrose Pl., Melville, N.Y. 11747

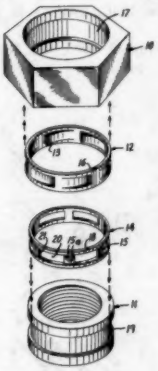
Continuation of Ser. No. 600,556, Apr. 17, 1984, abandoned, which is a continuation-in-part of Ser. No. 539,612, Oct. 6, 1983, abandoned. This application Jul. 7, 1986, Ser. No. 882,699

Int. Cl.[4] **F16B** *31/00*

U.S. Cl. 411—6 **11 Claims**

1. A torque limiting fastener comprising a driving element to

which a torque is applied, a driven element in telescoping relation with the driving element, and a torque limiting coupling enclosed between the inner and outer peripheries of the elements, said coupling including a pair of concentric rings, one carried by each of the elements, a resilient metal leaf spring carried by one ring, the leaf spring having a deflectable free end, a recess of generally complementary shape to the spring carried by the other ring to receive the deflected free end of the spring and interlock the elements together, and a pair of axially spaced walls defining the axial width of the recess, the engagement of the free end of the spring with the recess resisting axial displacement of the elements relative to each other



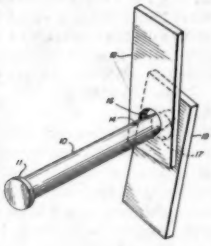
and the engagement of the free end of the spring with a surface adjacent the recess between said pair of axially spaced walls resisting rotational displacement in one direction to insure that when torque is applied to the driving element the rotation of the head element imparts rotation to the driven element to the torque limit for which it is designed and that the spring will yield and disengage from the recess when the torque limit is reached, the free end of the spring being initially deflectable from an inoperative position to permit the separate elements to be moved into telescoping relation to a position at which the free end of the spring moves automatically from the inoperative to its locking position within the recess and between the pair of axially spaced walls.

4,687,393

CENTERING PIN WITH OVALOID POINT

Wilbur O. Thompson, 815 S. 2nd St., DeKalb, Ill. 60115

Filed Dec. 6, 1985, Ser. No. 805,773
Int. Cl.[4] F16B *19/02*
U.S. Cl. 411—351 **3 Claims**



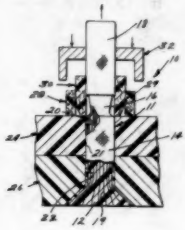
1. A pin which comprises:
(a) a head;
(b) a round central shaft; and
(c) a tapered point connected to the round shaft opposite the head having symmetrical opposing sides, each side having a radius substantially equal to the radius of said round shaft extending the length of said tapered point, said point having a straight longitudinal taper.

4,687,394

COMPOSITE RIVET WITH DEFORMABLE PLASTIC LOCKING RING

Imre Berecz, El Toro, Calif., assignor to Microdot Inc., Darien, Conn.

Filed May 29, 1985, Ser. No. 738,961
Int. Cl.[4] F16B *19/00*
U.S. Cl. 411—361 **3 Claims**



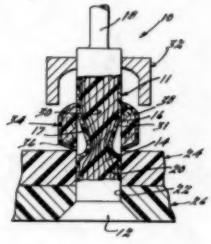
1. A composite rivet comprising
a preformed head portion,
a shear portion,
an integral mandrel extending from said shear portion having an annular recess therein,
a deformable plastic locking ring radially aligned with and filling the recess in said mandrel, and
a plastic collar telescoped about and radially aligned with said locking ring for controlling deformation thereof, said collar being reinforced with circumferentially extending fibers.

4,687,395

COMPOSITE RIVET WITH DEFORMABLE ANNULAR COLLAR CONTAINING RANDOMLY CHOPPED FIBERS

Imre Berecz, El Toro, and Dennis L. Hinton, Yorba Linda, both of Calif., assignors to Microdot Inc., Darien, Conn.

Filed May 29, 1985, Ser. No. 738,958
Int. Cl.[4] F16B *19/00*
U.S. Cl. 411—361 **1 Claim**



1. A composite rivet comprising an elongated one-piece body having an integral head portion, an integral shear portion, and an integral mandrel extending from said shear portion having an annular recess therein, and
a deformable annular plastic collar separate from the head and shear portions of said rivet and comprising chopped

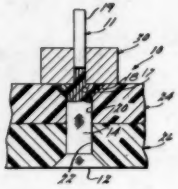
randomly orientated fibers encapsulated by a sheath of circumferentially extending continuous fibers set in a thermoplastic matrix, said collar having an initial inside diameter substantially equal to the initial outside diameter of said shear portion, said collar being deformable radially inwardly so as to be radially aligned with and fill the recess in said mandrel, the sheath on said collar directly engaging said mandrel to preclude protrusion of the chopped fibers of said collar.

4,687,396

ONE-PIECE COMPOSITE RIVET WITH DEFORMABLE HEAD PORTION AND MANDREL

Imre Berecz, El Toro, Calif., assignor to Microdot Inc., Darien, Conn.

Filed May 29, 1985, Ser. No. 738,959
Int. Cl.[4] F16B *19/08*
U.S. Cl. 411—503 **3 Claims**



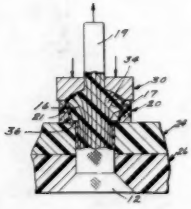
1. A one-piece composite rivet comprising
a preformed head portion,
a shear portion adjacent to and integral with said head portion,
a head forming portion adjacent to and integral with said shear portion,
a mandrel adjacent to and integral with said head forming portion,
said head forming portion being deformable to form a head on the opposite side of said shear portion from said preformed head, said formed head comprising material sheared from a radially outer portion of said mandrel whereby said mandrel extends therefrom after formation of said head.

4,687,397

COMPOSITE RIVET WITH STRIPPABLE MANDREL

Imre Berecz, El Toro, Calif., assignor to Microdot Inc., Darien, Conn.

Filed May 29, 1985, Ser. No. 738,960
Int. Cl.[4] F16B *19/08*
U.S. Cl. 411—503 **4 Claims**



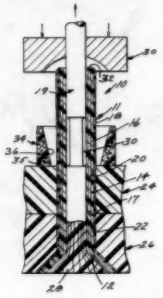
1. A composite rivet comprising
a preformed head portion,
a shear portion,
a head forming portion integral with said shear portion,
an integral mandrel extending from said head forming portion, and
a collar having an inside diameter greater than the initial outside diameter of the head forming portion of said rivet, said collar being telescoped about and radially aligned with said head forming portion for controlling radial deformation thereof,
said head forming portion being strippable from said mandrel and deformable radially outwardly to the inside diameter of said collar to lock said collar against axial movement away from the preformed head portion of said rivet.

4,687,398

COMPOSITE RIVET WITH COLLAR REINFORCED WITH CIRCUMFERENTIAL FIBERS

Imre Berecz, El Toro, Calif., assignor to Microdot Inc., Darien, Conn.

Filed May 29, 1985, Ser. No. 738,962
Int. Cl.[4] F16B *19/08*
U.S. Cl. 411—503 **2 Claims**



1. A composite rivet comprising
a tubular plastic preform having a first head portion, a shear portion and a head forming portion,
a mandrel extending centrally of said preform and having an annular recess therein,
the head forming portion of said preform being axially deformable and radially inwardly and outwardly expandable to form a second head on said rivet, and
a plastic collar reinforced with circumferentially extending fibers, said collar having an inside diameter greater than the outside diameter of said mandrel and telescoped about said preform and radially aligned with the annular recess in said mandrel for controlling radial deformation of the head forming portion of said preform, said collar having a truncated upwardly divergent conical inner surface.

4,687,399

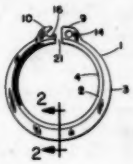
RETAINING RINGS INCLUDING ORIENTING SLOT AND HOLE CONFIGURATIONS, AND APPARATUS AND METHOD OF RING ORIENTATION

John A. Petrie, 1031 Carew Tower, Cincinnati, Ohio 45202

Filed Jan. 6, 1986, Ser. No. 816,414
Int. Cl.[4] F16B *21/18*
U.S. Cl. 411—518 **5 Claims**

1. A plurality of retaining rings each comprising an open-ended body of spring material having spaced apart ends and differently configured opposite sides, and orienting means at said ends for use in sorting the rings which have one side facing in one direction from the rings which have the opposite side facing in the opposite direction, said orienting means comprising hole means in one of said ends and open slot means in the other of said ends, said hole means in the rings having one side facing in one direction being engageable with a sorting element for retention of the rings facing in such one direction on the

sorting element, and said slot means in the rings having the opposite side facing in the opposite direction being engageable



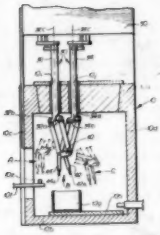
with the sorting element to permit the rings facing in the opposite direction to fall off the sorting element.

4,687,400

DEVICE FOR MOVING OBJECTS IN A CLOSED CONTAINER

Robert Lichti, Lakewood, Calif., assignor to Metals, Ltd., Newport Beach, Calif.

Filed Sep. 7, 1984, Ser. No. 648,073
Int. Cl.[4] B25J *3/00*
U.S. Cl. 414—4 **5 Claims**



1. A device for moving an object located within a container from one location within the container to another location within the container, the device comprising:

grasping means for grasping and releasing the object when actuated, the grasping means extending from a wall of the container and being positioned inside the container; and

operating means for actuating the grasping means and for moving the grasping means in two different directions along two different pathways within the container, the operating means comprising first and second parallel arm elements, each passing through an opening in a wall of the container and having an inner end located within the container and an outer end located outside of the container, said operating means further comprising pivotal link means for operatively coupling the arm element inner ends to the grasping means, wherein the arm elements are independently and axially movable through the openings to cause the inner ends to move along linear pathways and are constrained against movement other than said axial movement;

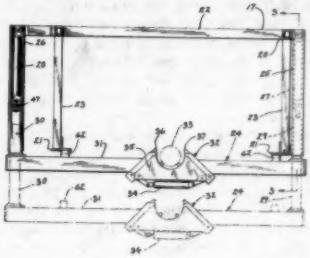
wherein selective movement of the inner end of the arm elements along their corresponding linear pathways causes the grasping means to move within the container in two different directions along two different pathways.

4,687,401

PIPE POSITIONER

Frank Gilanyi, South Milwaukee, Wis., assignor to Becor Western Inc., South Milwaukee, Wis.

Filed Sep. 30, 1985, Ser. No. 782,046
Int. Cl.[4] E21B *19/14*
U.S. Cl. 414—22 **5 Claims**



1. A pipe positioner for holding and positioning drill pipe in an earth drilling machine during drilling wherein a mast is of the tilting type and said pipe positioner is adapted to be activated during an angle drilling operation, comprising:

a frame member adapted to support jaw engaging means for drill pipe, said jaw engaging means including an open portion positioned in a direction toward said mast with slide bar members operatively positioned in a guide frame member and fluid powered means to actuate said jaw engaging means from a pipe engaging position to a non-engaging position;

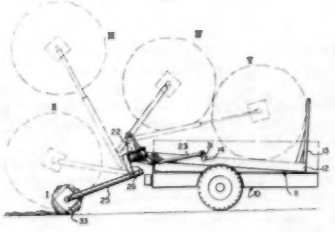
frame member activating means secured to said mast of said earth drilling machine above the mast deck, said frame member activating means constructed and arranged to provide a linear inward and outward movement of said frame member with respect to said mast above said mast deck with said open portion of said jaw engaging means facing said mast as said frame member is moved in the direction of said mast, said frame member activating means defined by inner and outer telescoping tubular members and hydraulic cylinder means connected to one of said telescoping tubular members.

4,687,402

CARRIER FOR CYLINDRICAL HAY BALES

Michael D. Zatylny, R.R. #1, Sundre, Alberta, Canada T0M 1X0

Filed Oct. 9, 1985, Ser. No. 785,834
Int. Cl.[4] A01D *87/12*
U.S. Cl. 414—24.6 **5 Claims**



1. A carrier for cylindrical hay bales comprising:

(a) a generally horizontal frame,

(b) a shaft pivoted in said frame about a horizontal axis;

(c) a pair of telescopic bale lifting arms mounted at first ends

thereof to opposite ends of said pivoted shaft, said arms being mounted to said shaft by pivot pins perpendicular to the axis of said shaft to permit lateral swinging of the arms about said pivot pins,

(d) bale piercing axle means at the outer ends of said arms for engaging and rotatably holding a cylindrical hay bale therebetween,

(e) hydraulic means for moving said arms toward and away from each other about said pivot pins,

(f) a primary hydraulic cylinder mounted at one end between a pair of crank arms fixed to said pivot shaft and mounted at the other end between a second pair of arms rotatably mounted on said pivoted shaft for either fixing or rotating said fixed and rotatable arms with respect to each other, and

(g) a secondary hydraulic cylinder mounted at one end to the frame and mounted at the other end between a third pair of arms extending from a sleeve rotatably mounted on the pivoted shaft, one of said second pair of arms being also one of said third pair of arms and the other of said second pair of arms being an arm extending from a separate sleeve rotatably mounted on the pivoted shaft, with said rotatable sleeves being on each side of said crank arms fixed to the shaft, and the primary and secondary hydraulic cylinders being pivotally connected to the second and third pairs of rotatable arms by means of a single pivot pin,

whereby with said primary hydraulic cylinder in fixed position thereby fixing the rotatable arms relative to the fixed crank arm, actuation of said secondary hydraulic cylinder causes movement of said bale lifting arms within an arc between a rearward position below the horizontal and a forward position beyond the vertical but short of attaining a forward horizontal position and whereby actuation of the primary hydraulic cylinder causes further movement of the bale lifting arms within a forward and downward arc toward a forward horizontal position.

4,687,403

ARTICLE DELIVERY APPARATUS

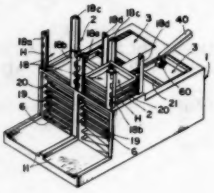
Kenro Motoda, Tokyo, Japan, assignor to Motoda Electronics Co., Ltd., Tokyo, Japan

Filed Sep. 19, 1984, Ser. No. 652,003

Claims priority, application Japan, Oct. 18, 1983, 58-193438; Feb. 29, 1984, 59-38179

Int. Cl.[4] B65G *60/00*

U.S. Cl. 414—32 **7 Claims**



1. An article delivery/receiving apparatus for delivering-/receiving articles through the use of trays in a factory, comprising:

a main body adapted to be disposed in the vicinity of a working station, and a carrier containing a stack of trays therein; and said main body including:

a tray loading/unloading portion having a space for encasing said carrier, and said carrier containing said stack of trays which is adapted to be loaded or unloaded;

a tray engaging neans provided in said tray loading/unloading portion and being sequentially engageable with each lowermost tray and the next lowermost tray of the stack, whereby said lowermost tray is released from said stack of trays;

first and second article delivery/receiving portions formed at an upper portion of said main body to allow for cooperation with a working robot, and each being disposed in juxtaposition to said tray loading/unloading portion;

a lift means, for stepwise vertical movement of said stack of trays to permit unstacking of said stack of trays as well as separate restacking of returned trays on top of said lift means;

first upper lateral feeding means provided in said main body for laterally shifting said lowermost tray to and from said first article delivery/receiving portion; and

a second upper lateral feeding means provided in said main body for laterally shifting the next lowermost tray to and from said second article delivery receiving portion.

4,687,404

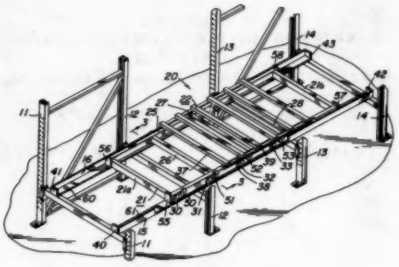
LOAD TRANSFER APPARATUS FOR PUSH-IN FLOW RACKS

Frederick G. Seiz, Telford; Carl G. Seiz, Hatfield, and Robert J. Egner, Quakertown, all of Pa., assignors to Seiz Corporation, Perkasie, Pa.

Filed Feb. 22, 1985, Ser. No. 704,286

Int. Cl.[4] A47F *5/00*

U.S. Cl. 414—276 **30 Claims**



23. For use in a storage rack having a pair of rails mounted in spaced relation and adapted to support loads in a plurality of tandem load positions, load transfer apparatus for use in loading, unloading and storing loads in the rack, comprising: an elongated carriage, a lower series of wheels mounted on said carriage for permitting it to move lengthwise on said rails, a load support overlying said carriage and extending lengthwise thereof for a distance less than the length of the carriage by a single load position, an upper series of wheels mounted on said carriage for permitting said load support to move relative to said carriage, and abutment means mounted on said carriage for engaging said load support to couple it to the carriage for movement together when the load support is pushed relative to the rack.

4,687,405

TRASH CAN DUMPING APPARATUS

David I. Olney, P.O. Box 6599, Concord, Calif. 94524

Filed Jun. 24, 1985, Ser. No. 748,262

Int. Cl.[4] B65F *3/04*

U.S. Cl. 414—408 **2 Claims**

1. Low profile trash container dumping apparatus for semi-automatically dumping refuse from trash bins, trash containers and trash receptacles into a refuse sink while permitting close physical access to the trash sink for the manual dumping of trash cans into the trash sink, the trash bins having laterally extending studs, the trash containers having upper and lower lifting engagement members and the trash receptacles having a mechanically engageable lip, the dumping apparatus comprising:

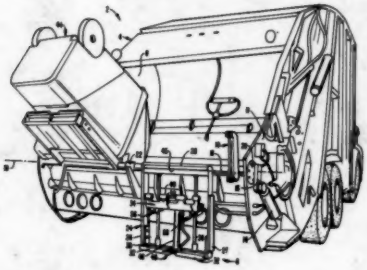
a support structure adjacent the refuse sink;

clamping and lifting apparatus mounted to the support structure, comprising:

a frame, having first and second ends, pivotally mounted at the first end to the support structure for movement about a common axis;

a trash receptacle lip engaging assembly mounted to the frame and including a clamping member movable along a path between a lip release position and a lip engaging position; and

a trash container engagement member engaging assembly including lower hook means, mounted to the frame, for engaging the lower engagement member and upper hook means, mounted to the clamping member for



movement therewith, for engaging the upper engagement member, the lower and upper hook means displaceable between extended, operational positions, for use when dumping trash containers, and displaced, non-operational positions, so not to interfere when dumping trash bins and trash receptacles;

means for driving the clamping member and the upper hook means therewith along the path;

means for rotating the frame about the common axis between a loading position and a dumping position; and

first and second spaced apart cradle assemblies, coupled to the frame for rotation therewith, for engaging the trash bin studs when the trash bin is adjacent the clamping and lifting apparatus.

4,687,406

LOAD LIFTING APPARATUS WITH OVERTURNING PREVENTION MEANS

Robert Kinsey, Nottingham, England, assignor to Kombilift Limited, Great Britain

Filed Apr. 15, 1986, Ser. No. 852,160

Claims priority, application United Kingdom, Apr. 20, 1985, 8510145

Int. Cl.[4] B66F *9/00*

U.S. Cl. 414—701 **7 Claims**

1. Load lifting apparatus comprising an extensible boom carrying load bearing means at an outer end and being pivotally mounted at an inner end for movements of elevation and depression to raise and lower, respectively, the load bearing means, the boom being pivotally mounted at its inner end on support structure of the apparatus and the apparatus comprising a hydraulically actuated elevating ram arranged to act between the support structure and the boom to raise and lower the boom and a hydraulically actuated extending ram to extend and retract the boom, the apparatus comprising monitoring means arranged to monitor the overturning moment of the boom and comprising a pivot arm to which a turning moment is applied by the elevating ram in supporting the boom and switching means arranged to be actuated as a consequence of deflection of the pivot arm against resilient supporting means upon a predetermined turning moment being exceeded, said switching means comprising a diverter valve which when the switching means is actuated whilst the boom is being lowered, diverts at least part of the ram-actuating fluid flow from the

elevating ram to the extending ram to urge retraction of the boom.

4,687,407

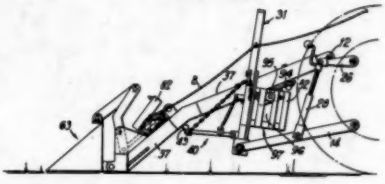
THREE-POINT HITCH LOADER

Don Osborne, Rte. 1, Box 145, Kieffer, W. Va. 24950

Filed Dec. 19, 1985, Ser. No. 810,769

Int. Cl.[4] B66C *3/02*

U.S. Cl. 414—703 **19 Claims**



1. A loading device for attachment to a vehicle, comprising:

a boom including loading means, said boom being pivotably secured at one end to a vehicle;

a first lifting means for lifting said boom by pivoting said boom at said one end, said lifting means being engageable with said boom at a position between the location of said loading means and said pivotably secured one end; and

a second lifting means for lifting said boom, said second lifting means being engageable with said boom between the location of said loading means and said position of engagement of said first lifting means;

wherein said boom is liftable by engagement with said second lifting means to a first predetermined position and is liftable by engagement with said first lifting means to a second predetermined position higher than said first predetermined position.

4,687,408

LOCK FOR THE TRANSPORT OF BULK MATERIAL

Manfred Klambauer, Neumarkt, Austria, assignor to Voest-Alpine Aktiengesellschaft, Linz, Austria

Filed Jun. 11, 1986, Ser. No. 872,876

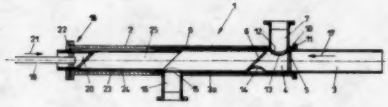
Claims priority, application Austria, Jun. 14, 1985, 1781/85

Int. Cl.[4] F26B *25/00;* **B65G** *65/00, 69/00*

U.S. Cl. 414—217 **11 Claims**

1. Lock for the transport of bulk material between chambers being under different pressure comprising a guide tube having on different sides of its wall a first opening leading to the chamber with lower pressure and in an axial distance there-

from a second opening leading to the chamber with higher pressure, a lock chamber (4) that is guided tightly and driven by a reciprocal movement in the guide tube (2), which lock chamber comprises openings (13, 14), which can be brought in coincidence with the first and the second opening (12, 15) of the guide tube at the reversal of the reciprocal movement, slide



slidably arranged in the guide tube for sliding, over the openings (12–15) of the guide tube (2), and at the end of the guide tube opposite of the first opening (12) a piston (20) which is guided tightly in the guide tube (2) and which is driven to move in opposite direction to the direction the lock chamber (4) so as to selectively increase or decrease the pressure in the lock chamber.

4,687,409

ARTICLE HANDLING APPARATUS

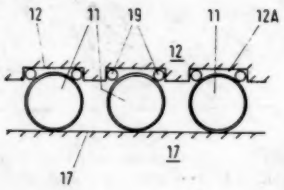
James Bone, Cumbria, United Kingdom, assignor to Vickers Shipbuilding and Engineering Limited, Barrow-in-Furness, United Kingdom

Filed Jun. 14, 1985, Ser. No. 745,299

Claims priority, application United Kingdom, Jun. 15, 1984, 8415295

Int. Cl.[4] B65G *25/02*

U.S. Cl. 414—750 **8 Claims**



1. Shell handling apparatus which is operable in a storage mode to store the shells and in a transfer mode to transfer the shells to and from storage respectively from or to shell loading and unloading stations, which apparatus comprises a storage magazine having a storage rack on which the shells can be stored, conveying means for traversing the shells along the storage rack when the apparatus is operating in its transfer mode, and restraining means shaped so as to be capable of locking the shells relative thereto and thereby positively locating the shells on the storage rack, in which:

the conveying means comprises indexing means engageable with the shells and operable, in the transfer mode of the apparatus, to roll the shells along the storage rack, wherein the indexing means

(a) is movable through an indexing cycle in which (i) it has a starting position in which it is engageable with a first batch of shells, consisting of one or more shells, (ii) it causes one increment of traversing movement of the batch, (iii) it releases itself from the engaged first batch, (iv) it returns to the starting position, and (v) it engages with a second batch of shells; and

(b) comprises a pawl arrangement which positively locates the shells relative thereto, during traversing of the shells along the storage rack, the pawl arrangement comprising a pawl bar having cut-outs in which the shells are located and which include rollers or low friction pads to permit rotation of the shells during traversing of the latter along the storage rack; and

the restraining means operable to locate any shells which may be present on a storage rack against first, generally up and down movement and also second, traversing movement relative to the storage rack while the apparatus is in its storage mode, and also while the indexing means is returning to a starting position during operation of the apparatus in its transfer mode.

4,687,410

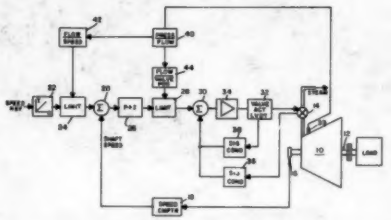
TORQUE LIMITER FOR PRIME MOVER

John A. Cline, Earlysville, Va., and William N. Iuliano, Sterling Junction, Mass., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 19, 1985, Ser. No. 766,465

Int. Cl.[4] F01D *17/06*

U.S. Cl. 415—17 **7 Claims**



1. An improved turbine control system for a steam turbine of the type having a control valve for regulating the flow of steam into the steam turbine, the control system including a speed reference input signal and a speed feedback signal indicative of turbine shaft speed; the control system further including a first summing junction for combining the speed reference signal and the speed feedback signal to provide a valve position command signal; a second summing junction for combining the valve position command signal with at least one valve actual position signal to provide a valve position error signal, wherein the improvement to the control system comprises:

means for sensing steam pressure in said steam turbine and providing a pressure signal;

means for converting the pressure signal into a steam flow signal;

a first signal limiter connected upstream from the first summing junction for receiving a maximum allowable speed signal in accordance with the steam flow signal; and,

a second signal limiter connected downstream from the first summing junction but upstream from the second summing junction for receiving a maximum allowable valve position signal in accordance with the steam flow signal; and, wherein flow converted to speed and flow converted to valve position are maximum allowable torque signals.

4,687,411

SPEED INCREASING GEAR FOR A CENTRIFUGAL COMPRESSOR

Kensaku Maeda, and Teiichi Mochizuki, both of Tokyo, Japan, assignors to Ebara Corporation, Tokyo, Japan

Filed Aug. 26, 1985, Ser. No. 769,326

Claims priority, application Japan, Mar. 25, 1985, 60-150

Int. Cl.[4] F01D *15/12*

U.S. Cl. 415—122 R **7 Claims**

1. A centrifugal compressor comprising:

an impeller,

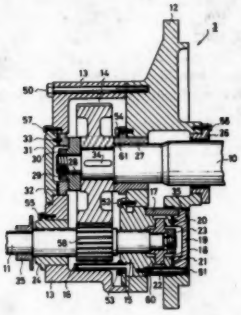
a speed increasing gear for increasing a speed of rotation of the impeller, and

a driving means for driving the speed increasing gear,

said speed increasing gear located between the impeller and

the driving means and having the impeller attached to the foremost end thereof, said speed increasing gear including a shaft having a rotational axis and provided with a pinion, a casing body provided with a divided face perpendicular to said axis, and a bearing unit arranged at an axially rear end portion of the shaft, and

said bearing unit including a thrust collar attached to the rear end of the shaft, an inner thrust bearing arranged adjacent to an inner axial side of the thrust collar opposite said rear end to support a thrust load applied to the thrust collar, an outer thrust bearing arranged adjacent to an outer axial side of the thrust collar axially opposite to said inner side to support a thrust load applied to the thrust



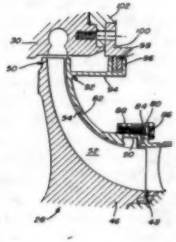
collar, a radial bearing formed integral to the inner thrust bearing to support a radial load applied adjacent to the rear end of the shaft, a housing body releasably connected with the radial bearing and enclosing the thrust collar, a housing cover connected with the housing body to support the outer thrust bearing from an axial side thereof opposite said thrust collar, and a spacer sandwiched between the outer thrust bearing and the housing cover to adjust the axial clearance between the inner and outer thrust bearings, wherein said bearing unit is freely detachably attached to the casing body from an axial direction opposite to the driving means, and wherein said pinion is positioned exterior to said bearing unit.

4,687,412

IMPELLER SHROUD

Stephen S. Chamberlain, Dollard des Ormeaux, Canada, assignor to Pratt & Whitney Canada Inc., Longueuil, Canada

Filed Jul. 3, 1985, Ser. No. 751,572
Int. Cl.[4] F04D *29/14*
U.S. Cl. 415—134 **6 Claims**



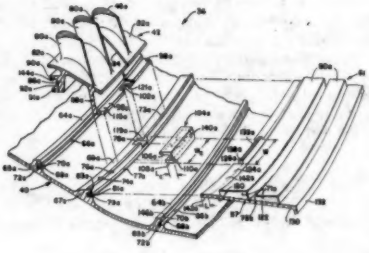
1. In a compressor for a gas turbine engine, an engine housing, a rotor assembly including an impeller, the impeller having an inlet portion with an axial component and an outlet portion with a radial component, the impeller including a hub having a flared cantilever radial configuration and a plurality of unshrouded blade tips, the rotor assembly being mounted to the engine housing by bearing means, a stator assembly including a shroud surrounding and concentric with the rotor assembly, the shroud including an impeller shroud member, the impeller shroud having a flared shape with an inlet portion fixed to the shroud and an outlet portion being unsupported, means mounting the stator assembly shroud to the engine housing only in the area of said bearing downstream of the compressor relative to the impeller, such that the shroud including the impeller shroud are supported at the area of said bearing in a cantilever manner and the thermal expansion growth distance of the impeller shroud is the same as the expansion growth distance of the impeller from the bearing, the impeller shroud surrounding the blade tips of the impeller with minimum clearance and whereby any deflection of the impeller shroud will occur at the outlet portion thereof in correspondence with any deflection of the outlet portion of the impeller.

4,687,413

GAS TURBINE ENGINE ASSEMBLY

Aldo Prario, Wethersfield, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Jul. 31, 1985, Ser. No. 761,136
Int. Cl.[4] F04D *29/54*
U.S. Cl. 415—190 **7 Claims**



1. A gas turbine engine assembly, comprising:

(a) an annular engine case having an annular, axially extending rail thereon, said rail having a plurality of axially extending, circumferentially spaced apart slots therein;

(b) an annular engine component comprising a plurality of arcuate, circumferentially disposed segments, each segment having an axially extending flange in overlapping contact with said rail, each flange having an axially extending slot therein radially aligned with one of said rail slots to form a keyway; and

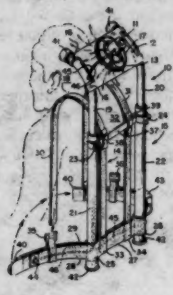
(c) a plurality of couplings, each coupling having two spaced apart legs, both legs extending axially from and integral with a back, said legs and back forming a C-shaped structure, wherein said overlapping portions of said rail and at least one of said segment flanges are disposed between and are contacted by said legs of one of said couplings, and said legs of said one coupling prevent relative radial movement between said rail and at least one of said flanges, and wherein each coupling has an axially extending key disposed between said legs and integral with at least one of said legs or with said back, wherein said key of one of said couplings engages one of said keyways and prevents relative circumferential movement between said rail and at least one of said flanges.

4,687,414

OUTDOOR FAN BACKPACK

Willie J. Wardy, Rte. 3, Box 464A, Effingham, S.C. 29541

Filed Mar. 5, 1986, Ser. No. 836,491
Int. Cl.[4] F04D *29/64*
U.S. Cl. 416—63 **1 Claim**



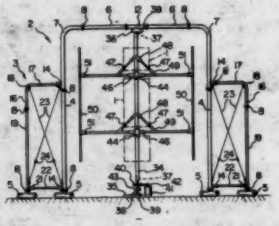
1. An outdoor fan backpack comprising:
a small, quiet, lightweight, electrical fan, operated by low voltage direct current, to create a breeze in and about the head of the individual wearing said backpack, and
a mounting plate and guard, attached between the upper portions of two vertically disposed and adjustable tubular members, which members are curved slightly inward at their tops to conform to the shoulders of said individual and are respectively secured at their bottoms to a belt and to parallel disposed shoulder straps at a point immediately behind the shoulders of said individual, to hold said electrical fan in a position slightly above and to the rear of the head of said individual, and
a battery pack and a control switch mounted on said belt and electrically interconnected with said electrical fan so that said control switch controls the flow of low voltage direct current to said electrical fan, to turn said electrical fan off and on and to regulate its speed.

4,687,415

WIND TURBINE FRAME

Bruno Bender, P.O. Box 1679, Edmonton, Alberta, Canada T5J 2N9

Filed May 9, 1986, Ser. No. 861,685
Int. Cl.[4] F03D *11/04*
U.S. Cl. 416—196 A **5 Claims**



1. A frame for a wind turbine comprising a first skeletal frame member for supporting a central rotor on a vertical axis, said first frame member comprising at least three vertical first post members spaced equidistant apart, an upper bearing support, and first horizontal crossbar members connecting said first post members and said upper bearing support, a second skeletal frame member for supporting said first frame member and including a plurality of second vertical post members equal in number to said first post members and spaced equidistant apart and radially outwardly of said first post members relative to said axis, second horizontal crossbar members connecting said second post members to said first post members for rigidifying said frame, and weighted ground supported foot members at the lower end of each of said post members.

4,687,416

METHOD AND DEVICE FOR DECREASING THE FLOW RESISTANCE ON WINGS PARTICULARLY AEROFOILS AND BLADES OF TURBOMACHINES EXPOSED TO GAS FLUX SUCH AS AIR

Günther Spranger, Wagnerstrasse 2, D-2000 Hamburg, Fed. Rep. of Germany

PCT No. PCT/DE82/00026, § 371 Date Sep. 27, 1982, § 102(e) Date Sep. 27, 1982, PCT Pub. No. WO82/02694, PCT Pub. Date Aug. 19, 1982
Continuation of Ser. No. 432,943, Sep. 27, 1982, abandoned. This PCT application Feb. 10, 1982, Ser. No. 699,226
Claims priority, application Fed. Rep. of Germany, Feb. 13, 1981, 3105183
Int. Cl.[4] B64C *11/16*
U.S. Cl. 416—223 A **5 Claims**

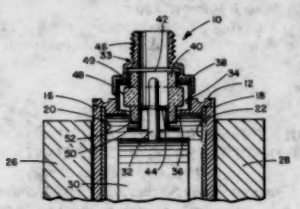
1. A device for use with fluid flow engines comprising:
a foil member (2) with a root (5) and a tip (7), said member having a fluid flow foil cross sectional configuration with upper and lower surfaces and a chord line (11) connecting leading (4) and trailing edges;
at least one blade (1, 1*a*) arranged on the upper surface of said foil member adjacent the leading edge thereof, said blade having a fluid flow cross sectional configuration with a chord line (10, 10*a*) connecting leading and trailing edges, said blade having one end (12) integrally mounted in said root (5) of said foil member (2) so that said blade extends at an angle from said leading edge (4) of said foil member to form a gap (6, 6*a*) between the other end (9, 9*a*) of said blade and the tip (7) of said foil member, said gap diverging in a direction away from said root of said foil member, said blade being formed such that the position of the chord line (10, 10*a*) of said blade changes with respect to the chord line (11) of said foil member between the region proximate said one end (12) of said blade and the region proximate said other end (9, 9*a*) of said blade, said fluid flow cross section of said blade having a greater camber proximate said one end than said other end said chord line (10, 10*a*) of said blade converging with the chord line (11) of said foil member toward said leading edge (4) in the region proximate to said one end (12) of said blade and diverging in the region proximate said other end (9, 9*a*) of said blade, said other end (9, 9*a*) of said blade (1, 1*a*) terminating coextensively with the tip (7) of said foil member (2), said blade (1, 1*a*) being shaped in conformity with said leading edge (4) of said foil member and said other end (9, 9*a*) of said blade being above said tip (7) of said foil member (2) wherein said foil member and blade are negatively swept.

4,687,417

HIGH VOLTAGE FEEDTHROUGH FOR ION PUMP

Kurt Amboss, Pacific Palisades, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 19, 1985, Ser. No. 810,486
Int. Cl.[4] F04B 37/02; F04F 11/00
U.S. Cl. 417—49 8 Claims



1. An ion pump comprising:

an ion pump body, said body having a pumping chamber therein, a vacuum connection to said pumping chamber so that said pumping chamber can be connected to a volume to be pumped, a cathode within said pumping chamber, a feedthrough opening in said body;

an anode within said pumping chamber, a post on said anode, said post extending through said feedthrough opening for support and electrical connection of said anode;

a tubular ceramic insulator bushing forming a feedthrough insulator, said bushing having an exterior wall and an interior wall, a portion of said exterior wall being sealed to said ion pump body and a portion of said interior wall being sealed to said post to provide vacuum integrity to said pumping chamber, said exterior wall of said ceramic bushing including a radially outwardly projecting annular flange extending radially exteriorly of said feedthrough opening in said body, the space radially exteriorly of said annular flange being exposed to the vacuum of said vacuum chamber, said annular flange having an exterior lateral surface extending completely around said insulator bushing and which is not visible through said feedthrough opening in said body so that said exterior surface extending completely around said insulator bushing is not in a direct sputtering line from said cathode.

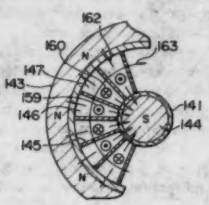
4,687,418

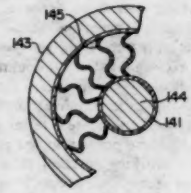
DEVICE FOR MAKING A FLUID HAVING ELECTRICAL CONDUCTIVITY FLOW

Tadashi Gotou, Hitachi, and Hisashi Yamamoto, Katsuta, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 19, 1985, Ser. No. 756,669
Claims priority, application Japan, Jul. 20, 1984, 59-149527; Jul. 20, 1984, 59-151585
Int. Cl.[4] H02K 44/00, 44/08
U.S. Cl. 417—50 2 Claims

1. A device for making a fluid having electrical conductivity flow, the device comprising a plurality of fluid passages annularly arranged such that electric current flows across the adjacent passages, and a magnetic field generating means for generating magnetic flux crossing said plurality of fluid passages in a radial direction, a plurality of partitioning plate means are provided for axially dividing an annular fluid passage into said





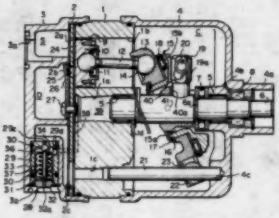
plurality of fluid passages, and wherein each of said partitioning plate means have a corrugated cross section.

4,687,419

VARIABLE ANGLE WOBBLE PLATE TYPE COMPRESSOR WHICH MAINTAINS THE CRANKCASE PRESSURE AT A PREDETERMINED VALUE

Shigeru Suzuki, Nishio; Masaki Ohta, Anjo, and Kenji Takenaka, Kariya, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi, Japan

Filed Dec. 23, 1985, Ser. No. 812,247
Claims priority, application Japan, Dec. 28, 1984, 59-275214
Int. Cl.[4] F04B 1/26
U.S. Cl. 417—222 5 Claims



1. A variable displacement wobble plate type compressor including a suction chamber for a refrigerant to be compressed, a discharge chamber for a compressed refrigerant, a plurality of cylinder bores in which associated reciprocatory pistons are disposed so as to draw the refrigerant from the suction chamber and then to discharge the refrigerant after compression to the discharge chamber, a closed crankcase for an assembly of wobble and drive plates to drive the reciprocatory pistons and a control means for changing an angle of wobble of the wobble plate in association with a pressure difference between a suction pressure in the suction chamber and a crankcase interior pressure thereby changing a compressor displacement, wherein said control means comprises:

built-in pressure detecting means for detecting a change in said crankcase interior pressure with respect to a predetermined pressure value including a casing member fitted in

a cavity formed in a head in which said suction chamber is defined,

a bellows member arranged inside said casing so as to define an atmospheric pressure chamber and a valve chamber separated from one another, and

a spring member accommodated in said bellows member and having a preselected spring constant permitting said bellows member to be collapsed when said crankcase interior pressure introduced into said valve chamber via said passageway means approaches said predetermined pressure value;

passageway means for providing a fluid communication between said suction chamber and said crankcase interior and;

a valve mechanism arranged in a portion of said passageway means and having a valve element operable to open said fluid communication between said suction chamber and said crankcase interior in response to a signal from the pressure detecting means indicating a rise in said crankcase interior pressure from the predetermined pressure value and to close said fluid communication in response to a signal indicating a drop in said crankcase interior pressure from the predetermined pressure value, thereby maintaining said crankcase interior at the predetermined pressure value, the predetermined pressure of said crankcase interior working on said pistons behind compression chambers of said cylinder bores to effect a decrease in the angle of wobble of said wobble plate.

4,687,420

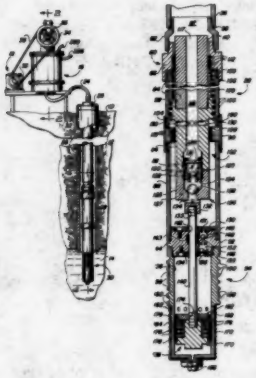
SONIC PRESSURE WAVE PUMP WITH LIQUID HEATING AND ELEVATING MECHANISM

Arthur Bentley, P.O. Box 238, Capitan, N. Mex. 88316

Filed Jun. 23, 1986, Ser. No. 877,456

Int. Cl.[4] E21B *36/04*; H05B *6/10*

U.S. Cl. 417—240 **22 Claims**



1. A pump mechanism for heating and elevating high viscosity subterranean oil comprising:

(a) power means for producing pumping forces;

(b) transmitting means coupled to said power means for receiving the pumping forces therefrom and transmitting them to a position proximate the subterranean oil to be heated and elevated;

(c) pump means coupled to receive the pumping forces from said transmitting means and including operating means for responding to the received pumping forces by producing oil elevating reciprocal movements, said operating means including,

I. a housing defining an axial bore and formed of a non-permanently magnetizable material and having alternately arranged annular grooves and fins formed axially along the periphery thereof,

II. a piston in the bore of said housing for reciprocal movement with said operating means, said piston having magnet means defining a plurality of polar regions arranged to be in contention with each other for generating heat when said piston is reciprocally moved in the bore of said housing; and

(d) means for producing irregular movements of said piston during at least one stroke of the reciprocal movement thereof.

4,687,421

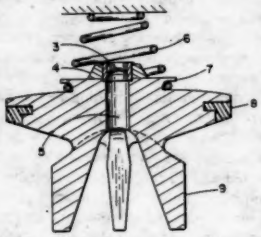
FRANGIBLE PRESSURE RELIEF DISC ASSEMBLY AND POSITIVE DISPLACEMENT PUMPS CONTAINING THE DISC ASSEMBLY

Donald C. Cameron, Tulsa, Okla., and Paul M. Shireman, Westerville, Ohio, assignors to Dowell Schlumberger Incorporated, Tulsa, Okla.

Continuation of Ser. No. 447,068, Dec. 6, 1982, abandoned. This application Sep. 20, 1985, Ser. No. 778,352

Int. Cl.[4] F04B *49/00*

U.S. Cl. 417—296 **4 Claims**



1. A high-pressure positive displacement pump having a vacuum and pressure stroke having a combination safety and check valve comprising:

at least one cylinder having a bore therein, a piston mounted in the bore for fluidtight reciprocal motion and adapted to be connected to a power source;

a chamber in fluid communication with the cylinder, the chamber having a fluid inlet and fluid outlet means;

the fluid outlet including an outlet aperture in the chamber, a seat and resiliently mounted outlet valve normally biased shut but open during the pressure stroke;

the fluid inlet means including an inlet aperture in the chamber, a seat and a resiliently mounted combination check and safety valve normally biased shut but open during the vacuum stroke;

the combination check and safety valve including a support member adapted to withstand the high operating pressures having a first side and second side, the first side of the support member having a shape adapted to sit in fluidtight communication on the seat of the inlet aperture, a passageway in the support member providing fluid communication between the first and the second side, a sphere segment pressure frangible disc attached to the support member and positioned to form a fluidtight seal covering the passageway, said frangible disc having its convex side facing toward the chamber and staying in a fluidtight position during the high operating pressures of the pump but rupturing when the pump exceeds the operating pressures, thereby lowering the pressure in the system below its operating pressure until the frangible disc is replaced, thus protecting the pump and allowing high pressure fluid to be released through the passageway in the support member through the inlet aperture and into a fluid reservoir without venting it into the environment outside of the pump and its fluid system;

spacing means operatively attached to one side of the sup-

port member to hold it in position relative to the fluid inlet means; and

biasing means operatively attached to one side of the support means for holding the combination check and safety valve in a normally closed position.

4,687,422

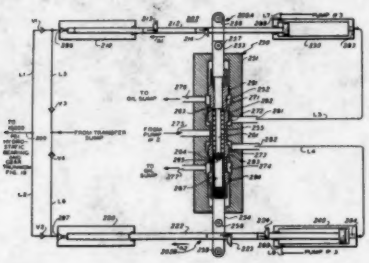
CONTINUOUS EXTRUSION APPARATUS

Francis J. Fuchs, Jr., P.O. Box 10016, Naples, Fla. 33941

Division of Ser. No. 714,905, Mar. 22, 1985, Pat. No. 4,663,699. This application May 30, 1986, Ser. No. 868,519

Int. Cl.[4] F04B *9/10*

U.S. Cl. 417—345 **1 Claim**



1. Fluid pressure intensifier, comprising:

first and second relatively high pressure pump means each including a drive piston mounted for reciprocating sliding axial movement into axial positions, said first and second relatively high pressure pump means for independently receiving a relatively low pressure fluid and pressurizing said fluid into a relatively high pressure;

an intensifier output;

control means for controlling the reciprocation sequence of said first and second high pressure pump means to cause said pump means to deliver said fluid pressurized to said relatively high pressure to said intensifier output at a substantially continuous flow and at a substantially constant pressure;

said control means operable in accordance with respective predetermined axial positions of said drive pistons, and wherein said first and second pump means each further include a high pressure pump cylinder and a drive cylinder aligned axially with respect to each other and with respect to said drive piston and wherein the forward portion of said drive piston is mounted reciprocably in said high pressure pump cylinder and wherein the rearward portion of said reciprocably mounted drive piston is mounted reciprocably in said drive cylinder, said drive piston provided intermediately with a pair of axially displaced and oppositely disposed predetermined spring biased cams and wherein said first and second pump means are positioned in predetermined parallel and laterally displaced positions with respect to each other, each said high pressure pump cylinder for receiving relatively low pressure fluid at its ends which is pressurized to a relatively high pressure upon said drive piston being advanced by said drive cylinder whereupon said relatively high pressure fluid is delivered to said intensifier ouput, the forward portion of each of said drive cylinders for being constantly communicated with a source of first pressurized drive fluid to cause said drive cylinder to retract said drive piston;

wherein said control means comprise a four-way control valve including a valve cylinder having a spool mounted therein for reciprocating sliding axial movement, and a pair of push rods mounted at opposte ends of said spool and extending axially outwardly through said valve cylinder, each push rod provided with a pair of axially displaced cam followers, said control valve positioned at a predetermined position between said first and second pumps and oriented perpendicularly with respect thereto, said spool normally occupying a central position within said valve cylinder with a predetermined cam follower of each push rod engageable by a predetermined cam of one of said drive pistons upon the advancement thereof; and

said four-way control valve for being connected to a source of second pressurized drive fluid and upon said spool occupying said central position said second pressurized drive fluid for bein communicated through said control valve to the rear of said drive cylinders to cause said drive cylinders to advance said drive pistons within said high pressure pump cylinders, upon each of said drive pistons being advanced into a predetermined axial position said predetermined cam engaging said predetermined cam follower of a predetermined one of said push rods to impart first predetermined axial movement to said spool to disconnect and vent said second pressurized drive fluid from the drive cylinder of the other of said drive pistons to halt the advance thereof while said second pressurized drive fluid is maintained communicated to the drive cylinder of each drive piston, and upon said each drive piston being advanced to a second predetermined axial position, the other of its cams engaging the other cam follower of said predetermined push rod to impart axial movement to said spool in a direction opposite to said first axial movement to return said spool to its central position and upon the advance of said drive piston being halted said first pressurized drive fluid retracting said each drive piston, upon said axialmovements of said spool a predetermined reciprocation advancement sequence imparted to said drive pistons to cause at least one of said drive pistons to be advanced at all times to cause said pumps to deliver at said intensifier output a substantially continuous flow of said relatively high pressure fluid at a substantially constant pressure.

4,687,423

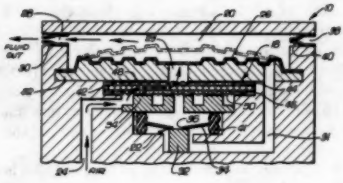
ELECTROCHEMICALLY-DRIVEN PULSATILE DRUG DISPENSER

Henri J. R. Maget, Los Altos, and Paul Krejci, Pacific Beach, both of Calif., assignors to Ivac Corporation, San Diego, Calif.

Filed Jun. 7, 1985, Ser. No. 742,192

Int. Cl.[4] A61M *31/00*

U.S. Cl. 417—379 **15 Claims**



1. An electrochemically-driven pulsatile drug dispenser, comprising:

a pump chamber having a pump inlet and a pump outlet;

an electrochemical pump for pumping a motive fluid, said electrochemical pump having a motive fluid inlet and a motive fluid outlet;

pressure transmission means disposed between said pump chamber and said motive fluid outlet, said pressure transmission means being displaced in response to pressure of said motive fluid at said motive fluid outlet; and

a pump valve having a valve inlet in fluid communication with said motive fluid outlet and a valve outlet in fluid communication with said motive fluid inlet, said pump valve being responsive to said motive fluid pressure

whereby said pump valve releases said motive fluid pressure exerted upon said pressure transmission means when said motive fluid pressure reaches a predetermined value, wherein the pump valve includes:

a pump valve seat; and

a pump valve diaphragm having a perforation, wherein the pump valve diaphragm moves upward from the pump valve seat and, at the predetermined value, snaps open and releases the pump pressure through the perforation.

4,687,424

REDUNDANT PISTON PUMP FOR THE OPERATION OF SINGLE OR MULTIPLE CHAMBERED PNEUMATIC BLOOD PUMPS

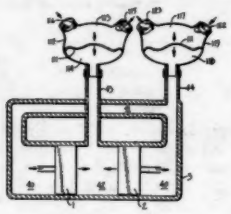
Horst P. Heimes, Aachen, Fed. Rep. of Germany, assignor to Forschungsgesellschaft Fuer Biomedizinische Technik E.V., Fed. Rep. of Germany

Division of Ser. No. 604,994, Apr. 27, 1984, Pat. No. 4,611,578. This application Jun. 19, 1986, Ser. No. 876,193

Claims priority, application Fed. Rep. of Germany, May 3, 1983, 3316101

Int. Cl.[4] F04B *9/12, 9/08*

U.S. Cl. 417—384 **5 Claims**



1. A piston pump for operating a chambered pneumatic blood pump, comprising:

a hollow cylinder which is closed at both ends,

a pair of pistons slidably mounted within the cylinder, said pistons and the interior wall of said cylinder defining a first chamber between the pistons and second and third chambers between the pistons and the ends of the cylinder,

means for driving the pistons independently of, and in opposition to each other,

a first pneumatic connection between a first chamber of the blood pump and one of said first, second or third chambers of the piston pump,

a second pneumatic connection between a second chamber of the blood pump and another of the first, second or third chambers of the piston pump, and

first valve means within said second pneumatic connection for selectively blocking access to either the second or the third chambers of the piston pump, and

further comprising second valve means for selectively venting at least one of said chambers of the piston pump to the atmosphere allowing the remaining chamber or chambers of the piston pump to be connected to the blood pump chamber or chambers.

4,687,425

FUEL INJECTION PUMP HAVING SINTERED CAM RING SECURED TO BODY BY BOLT

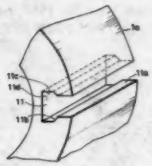
Yoshiya Takano, Katsuta; Yoshikazu Hoshi, Toukai; Takao Abe, Hitachi, and Ryozoo Tomozaki, Mito, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

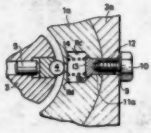
Filed Jul. 27, 1984, Ser. No. 635,152

Claims priority, application Japan, Aug. 3, 1983, 58-141072

Int. Cl.[4] F04B *19/02*

U.S. Cl. 417—462 **6 Claims**





1. In a fuel injection pump having a sintered cam ring secured to the inner surface of a cylindrical body, and a rotor which supports a pair of rollers and a pair of pistons rotating along the inner surface of said cam ring and is driven by an engine, the improvement comprising said cylindrical body having

a pin hole opened at a portion of said body where a bolt is received; said sintered cam ring having a groove formed in the outer surface

thereof along the central axis of said cam ring such as to oppose said pin hole in said cylindrical body, said groove being formed along the axial direction of the sintered cam ring when said sintered cam ring is pressure-molded before the sintering of the cam ring;

a positioning member inserted such as to stretch between said groove and said pin hole; and

said bolt for tightening said sintered cam ring and said body from the outer surface of said body through said positioning member which is secured in both said pin hole and groove.

4,687,426

CONSTANT VOLUME PULSATION-FREE RECIPROCATING PUMP

Hiroichi Yoshimura, Hirakata, Japan, assignor to Fuji Techno Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Jun. 19, 1985, Ser. No. 746,828

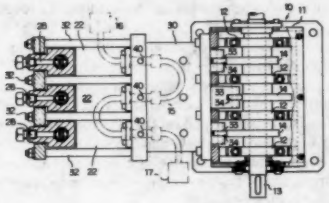
Claims priority, application Japan, Jul. 31, 1984, 59-162590; Aug. 13, 1984, 59-169701; Aug. 14, 1984, 59-169807

Int. Cl.[4] F04B *11/00*

U.S. Cl. 417—539 **3 Claims**

1. A cam mechanism for a constant volume, pulsation-free reciprocating pump having three plunger pumps each comprising a bore, a piston, at least one suction port and valve and at least one delivery port and valve and being connected to a common delivery pipe, said cam comprising three plate cams affixed on a common shaft at 120° intervals to each other, said cams having an ascending region having a duration of 180° during which displacement increases as the angle of rotation of the plate cam increases and a descending region having a duration of 180° during which displacement decreases as the angle of rotation of the plate cam increases, said ascending region and descending region being divided into seven phases,

the first phase being one during which the rate of acceleration gradually increases, the second phase being one during which the rate of acceleration is constant, the third phase being one during which the rate of acceleration gradually decreases to zero, the fourth phase being one during which the rate of acceleration is zero, the fifth phase being one during which the



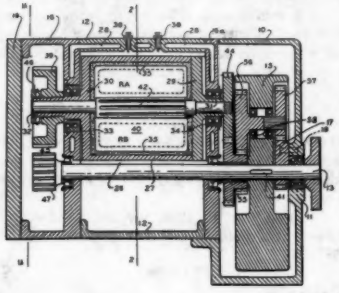
rate of acceleration gradually decreases, the sixth phase being one during which the rate of acceleration is constant, and the seventh phase being one during which the rate of acceleration gradually increases to zero, the arrangement of cam profiles being such that the sum of the displacement per unit angle of rotation of the three cams is constant.

4,687,427

ROTARY INTERNAL COMBUSTION ENGINE WITH UNIFORMLY ROTATING PISTONS COOPERATING WITH REACTION ELEMENTS HAVING A VARYING SPEED OF ROTATION AND OSCILLATING MOTION

Frederick W. Seybold, 1979 Dogwood Dr., Westfield, N.J. 07090

Filed Apr. 24, 1986, Ser. No. 855,315
Int. Cl.[4] F02B *53/00*
U.S. Cl. 418—34 **7 Claims**



1. An improved rotary internal combustion engine comprising in combination:

a water-cooled housing having a cylindrical bore, exhaust and intake ports, water-cooling cavities and ignition means;

a hollow cylindrical rotor rotatably disposed in said cylindrical bore, said rotor having two diametrically-opposed wedge-shaped pistons integral with said rotor, and axial, helical slots adjacent to said pistons, said rotor having axially spaced side walls with first and second hubs thereon for mounting snap-ring bearings, one of said hubs being constructed to receive adjustable locking means;

a first side housing having water-cooling cavities and bolted to said water-cooled housing and supporting one of said snap-ring bearings;

a second side housing having water-cooling cavities and bolted to said water-cooled housing and supporting another of said snap-ring bearings;

a primary shaft journaled in said first and second hubs, said shaft constructed to receive a spur gear fastened to one end;

a reaction element comprising two radially-directed diametrically-opposed wedge-shaped members mounted on said primary shaft, constructed for movement in periodical coalescing relation to said pistons;

a flywheel housing bolted to said second side housing;

a flywheel disposed in said flywheel housing and journaled on one end of a drive shaft supported on roller bearings in said flywheel housing;

a first compound gear supported on bearings mounted on said flywheel, said compound gear comprising a first spur gear and a first elliptic gear;

a second elliptic gear secured to said flywheel housing in mating relation with said first elliptic gear;

a compound pinion free to rotate on said drive shaft in mating relation with said first spur gear of said compound gear and said pur gear fastened on said primary shaft;

a first sprocket secured to the other end of said drive shaft in said first side housing;

a second sprocket larger than said first sprocket fixed on one of the hubs of said rotor at the opposite end of said drive shaft from said flywheel housing; and

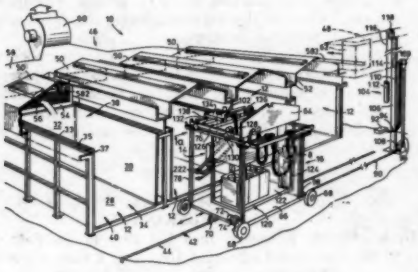
means comprising a chain drive connecting said first sprocket and said second larger sprocket for delivering power from said rotor to said drive shaft.

4,687,428

MANUFACTURE OF GLASS FIBRE TRUCK BODIES

Roger J. Martin; William C. McKee; Scott J. Vader, and Frederick C. Seymour, all of Toronto, Canada, assignors to Unicell Limited, Toronto, Canada

Filed Oct. 22, 1985, Ser. No. 790,123
Int. Cl.[4] B29C *41/08*
U.S. Cl. 425—60 **19 Claims**



1. A body manufacturing system for manufacturing bodies for vans, trainers, trucks comprising:

(a) a molding station having a plurality of molds each of which has a bottom face, a pair of oppositely disposed side faces and an end face, each mold having an open top and an open front end, the molds being arranged in a side-by-side relationship with their open front ends disposed toward a guide path which extends transversely thereof,

(b) a glass fibre applicator adapted to apply a layer of com-

pacted glass fibre and resin to the bottom side and end faces of one of said molds to form a glass fibre shell,

(c) longitudinal guide means associated with each mold for guiding the glass fibre applicator along the length of each mold as said applicator applies the required layer to form said shell,

(d) transfer means for supporting and transporting said applicator along said guide path from one mold to another,

(e) liner inserter and roof beam locater means for inserting an end wall liner, a pair of side wall liners, and a plurality of roof beams simultaneously into a mold in which said shell has been formed, and for pressing said liners against end and side faces, respectively, of said shell and said roof beams against a face of said shell formed against the bottom face of the mold, such that said liners and said roof beams may be secured to said shell,

(f) extraction means for extracting the body from the mold in which said body is formed,

(g) righting means for supporting said body and for turning said body right side up for mounting on a chasis of a vehicle.

4,687,429

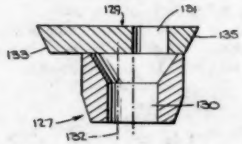
DIE HEAD FOR CONVERTING A CO-EXTRUDER APPARATUS

William J. Simelunas, Glen Rock, N.J., assignor to Nabisco Brands, Inc., Parsippany, N.J.

Continuation of Ser. No. 738,035, May 24, 1985, abandoned. This application Apr. 14, 1986, Ser. No. 852,076

Int. Cl.[4] B29C *47/12*

U.S. Cl. 425—192 R **3 Claims**



1. An extrusion die for use in a co-extrusion apparatus having a pair of juxtaposed extruder outlets and coupling means for securing a co-extrusion die to said coextrusion apparatus at said outlets, said extrusion die comprising:

a nozzle;

a mounting plate attached to said nozzle and provided with a single eccentrically disposed opening communicating on one side with said nozzle; and

engagement means on said mounting plate for cooperating with the coupling means of the co-extrusion apparatus to secure the extrusion die thereto so that said opening communicates on another side with one of the outlets of said co-extrusion apparatus and so that said mounting plate blocks the other of said outlets.

4,687,430

CO-EXTRUSION DIE

Dennis Morris, Filmaster, Inc.; 561 Rte. 46, Fairfield, N.J. 07006, and Frank Goffreda, 1 Higa Ter., Union, N.J. 07038

Filed Mar. 21, 1986, Ser. No. 842,142

Int. Cl.[4] B29C *47/06*

U.S. Cl. 425—133.1 **32 Claims**

1. A co-extrusion die for simultaneously extruding different extrudate into a multilayer tube comprising:

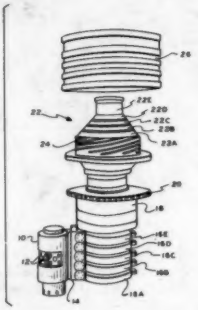
a casing having an inlet side and an outlet side; and

a plurality of mandrels coaxially nested within said casing about a predetermined axis, said casing being shaped on the interior of its outlet side to mate with said mandrels and provide an annular outlet, said casing and said mandrels being positioned and shaped to form a plurality of interspaces, at least one of said interspaces shaped to define an annular passage, another shaped to define a spiral passage, said annular and spiral passages communicating with said annular outlet, said annular passage having a shape for providing noncircumferential extrudate flow, said annular passage having an upstream end marked by a columnar to annular transition, said transition ending where it encircles without intersecting said predetermined axis.

26. A co-extrusion die for simultaneously extruding different extrudate into a multilayer tube, comprising:

a casing having an inlet side and an outlet side;

a plurality of mandrels coaxially nested within said casing, said casing being shaped on the interior of its outlet side to mate with said mandrels and provide an annular outlet, said casing and said mandrels being positioned and shaped to form a plurality of interspaces communicating with said annular outlet;



a plurality of nested tubes coaxially connected to the outlet side of said casing to form a plurality of axial passageways, each of said interspaces shaped and ported to communicate with a corresponding one of said axial passageways; and

a flow means connected to the downstream end of said nested tubes and having a plurality of inlet conduits, each communicating with a corresponding one of said axial passageways, said flow means being operable in at least a predetermined one of said inlet conduits to divert said extrudate away from predetermined stagnation points about that one of said tubes facing said predetermined one of said conduits, said flow means being operable to increase the velocity of said extrudate while being turned from a primarily radial direction into a direction having circumferential and axial components primarily.

4,687,431

MOLD PRESS HAVING A MOLD CLEANING DEVICE

Ernst Stengelin, Neuhausen, Fed. Rep. of Germany, assignor to Klöckner Ferromatik Desma GmbH, Malterdingen, Fed. Rep. of Germany

Filed Mar. 10, 1986, Ser. No. 837,686

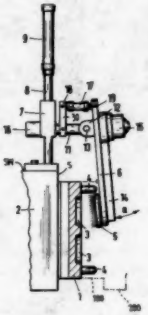
Claims priority, application Fed. Rep. of Germany, Mar. 30, 1985, 3511797

Int. Cl.[4] B29C *33/72*

U.S. Cl. 425—229 **8 Claims**

1. In a mold press having a pair of relatively movable mold parts for the production of molded workpieces of rubber or plastic, each of said mold parts comprising a movable clamping plate and a mold half mounted on a front surface thereof, a mold cleaning device fixedly mounted on a side wall of one of said mold part, said side wall lying perpendicular to said front surface thereof, said device comprising elongated guide means extending parallel to said front surface thereof, a guide plate mounted on said guide means for sliding movement toward

and away from said side wall and in a direction parallel to said front surface, means for adjusting the position of said guide plate along said guide means, a shaft transversely extending from said guide plate and pivotable about its central axis which lies perpendicular to said front surface, means for swinging said shaft about said axis thereof, a brush supporting arm mounted on said shaft for swinging movement together therewith about said shaft axis and for pivotal movement about an axis perpendicular to said shaft axis, a rotatable disc brush mounted on said arm for rotation about an axis parallel to said shaft axis and perpendicular to said front surface, means for



rotating said brush about said axis thereof, a holder mounted on said shaft for swinging movement together therewith, and axially extendable means interconnecting said holder with said arm for pivoting said arm about said axis which lies perpendicular to said shaft axis for thereby moving said brush toward and away from the mold surface of said mold half on said one mold part, whereby said rotatable brush is capable of being moved by said adjusting means and said swinging means about substantially the entirety of said mold surface for selectively or entirely cleaning said surface including mold pockets, while avoiding any obstructions on said surface during cleaning, and facilitates ejection of the molded workpieces.

4,687,432

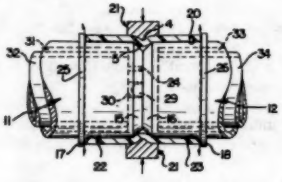
APPARATUS FOR FORMING PLASTIC PIPE COUPLINGS

Andrew L. Cross, Burton, and Thomas F. Moran, Jr., Aurora, both of Ohio, assignors to Midwest Plastic Fabricators, Inc., Chagrin Falls, Ohio

Division of Ser. No. 587,493, Mar. 9, 1984, Pat. No. 4,623,506, which is a continuation-in-part of Ser. No. 403,348, Jul. 30, 1982, abandoned. This application Sep. 15, 1986, Ser. No. 907,319

Int. Cl.[4] B29C *57/04*

U.S. Cl. 425—387.1 **2 Claims**



1. An apparatus for forming couplings for joining two pipes together from blanks made from lengths of extruded plastic pipe, comprising:

means for cutting said extruded pipe into blanks of appropriate length;

means for heating said blanks to the thermoplastic point;

two opposed mandrels having ends and exterior diameters, said mandrels being coaxially aligned and being tapered toward said ends, said ends being beveled, the tolerance between the exterior diameter of the mandrel and the interior diameter of the blank being substantially close enough to cause air pressure to build between the ends of the mandrels when the mandrels are brought substantially together with most of said air escaping around said mandrels to prevent significant contact between the mandrel surface and the blank and prevent marring of the inside surface of the blank, said air pressure causing a bulge in said blank, there being an orifice and air hole in one of the mandrels which permits excess air to escape from between the ends of the mandrels and still allows for the bulge to be made;

means for the circulation of a coolant within the mandrels to cause the inside surface of said blank to be cooled;

means for moving said mandrels substantially together;

a split die which captures the blank at about the bulge, said die impressing a groove in the outside surface of the blank and forming a ridge in the inside surface of the blank, said split die being capable of supporting said blank while said mandrels are withdrawn; and

a cooling bath into which the blank is deposited.

4,687,433

DIE FOR EXTRUDING CERAMIC HONEYCOMB STRUCTURAL BODIES

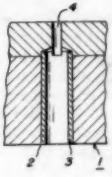
Sei Ozaki, Aichi; Shoji Futamura, Kawasaki; Masaru Kojima, Nagoya, and Satoru Inoue, Aichi, all of Japan, assignors to NGK Insulators, Ltd. and Institute of Technology Precision Electrical Discharge Works, both of, Japan

Filed Feb. 24, 1986, Ser. No. 832,438

Claims priority, application Japan, Mar. 28, 1985, 60-62074

Int. Cl.[4] B29C *47/12*

U.S. Cl. 425—464 **14 Claims**



1. A die for extruding a ceramic batch for forming ceramic honeycomb structural bodies, comprising:

a plurality of ceramic batch exhaust grooves;

a plurality of ceramic batch supply apertures; and

a plurality of tubes fitted into at least some of said plurality of ceramic batch supply apertures, said supply apertures individually forming passages in said die and said supply apertures collectively with said plurality of tubes forming passages in said die, said passages controlling a flow resistance of the ceramic batch passing through said passages by resulting in a different flow resistance in at least two of said passages.

4,687,434

APPARATUS FOR MOLDING TWO-PIECE PLASTIC FASTENER

Gregory O. Beglinger, Woodstock, Ill., assignor to Phillips Plastics Corporation, Phillips, Wis.

Division of Ser. No. 482,526, Apr. 6, 1983, Pat. No. 4,571,134. This application Oct. 24, 1985, Ser. No. 790,884

Int. Cl.[4] B29C *45/36, 45/40*

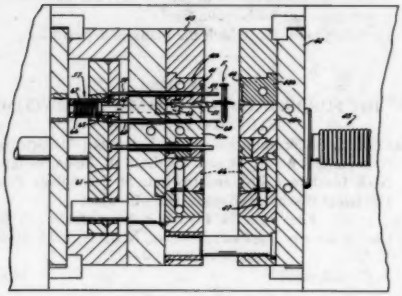
U.S. Cl. 425—556 **4 Claims**

1. Apparatus for molding a plastic unit, said plastic unit being in the form of a fastener having a front end, a rear end

and opposite lateral sides, said plastic unit comprising a grommet having a head with a substantially flat front surface and said plastic unit further having a pair of legs that project from said front surface of said head toward said front end of said fastener and define between said legs a slot which is open on opposite lateral sides of said fastener and which communicates with a hole through said head, said plastic unit further comprising a pin receivable through said hole through said head for lengthwise movement in said slot toward said front end of said fastener to an operative position wherein the pin holds the legs flexingly diverged, and said unit also comprising a frangible flashing connected between a front end portion of the pin and said head, said apparatus comprising:

A. first and second die members, each having a cavity that opens to a flat surface,

(1) said first die member being movable relative to said second die member in opposite directions normal to the flat surfaces of said die members, to and from a mold closed position in which said flat surfaces are engaged, and



(2) the cavity in each die member defining a shape corresponding to one longitudinally extending half of said plastic unit that includes a half of each of said legs; and

B. a core element lengthwise movable in one of said opposite directions with and relative to said first die member as said first die member moves to said mold closed position, said core element cooperating with said die members to define

(1) a rear portion of said slot,

(2) a front end surface of said pin, and

(3) a radially extending groove in said flat front surface of said head that opens unrestrictedly from one lateral side of said slot and extends to a periphery of the head, which groove has a groove surface therein facing toward said front end of said fastener that is in rearwardly offset relation to said flat front surface of the head and is flush with said front end surface of the pin, a portion of said groove surface also defining the front end surface of said frangible flashing.

4,687,435

PULSE COMBUSTOR

Takashi Matsuzaka, Fuji; Toshihiko Saito, Tokyo, and Satoshi Hisaoka, Fujinomiya, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 29, 1985, Ser. No. 717,882

Claims priority, application Japan, Mar. 30, 1984, 59-46051[U]

Int. Cl.[4] F23C *11/04*

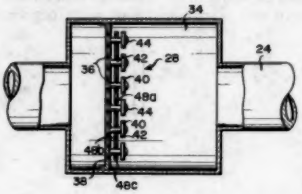
U.S. Cl. 431—1 **15 Claims**

1. A pulse combustor comprising:

a casing having a combustion chamber therein;

supply means for supplying a combustion material to the combustion chamber, said combustion material including air and fuel;

valve means for controlling the combustion material supply to the combustion chamber, said valve means including a base plate with a plurality of supply hole means for the passage of the combustion material, and flapper vlve-means for opening and closing the supply holes in accordance with the change of pressure inside the combustion chamber, said flapper valve means including a plurality of concentrically arranged ring-shaped segments of a substantially curvilinear inner and outer shape which define



different areas, and each of said segments being formed with guide holes, spaced diametrically;

a plurality of spacers, extending from the base plate and inserted into the corresponding guide holes, for allowing said segments to move only in its axial direction, but not in any other direction; and

a plurality of valve guards, mounted on the extended ends of the spacers, each for preventing the corresponding segment from leaving the spacers.

4,687,436

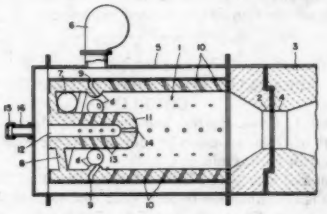
GASIFIED FUEL COMBUSTION APPARATUS

Tadao Shigeta, 840-1, Ushizuma, Shizuoka-Shi, Shizuoka-Ken, Japan

Filed Aug. 5, 1986, Ser. No. 893,570

Int. Cl.[4] F23C *5/32*

U.S. Cl. 431—173 **5 Claims**



1. A gasified fuel combustion apparatus comprising:

a cylindrical combustion chamber having an outer wall made of a heat-resistant material;

an air chamber provided to surround said combustion chamber;

a blower located on a wall of said air chamber so as to supply air to said air chamber;

a fuel supplying tube opening into a closed end of said cylindrical combustion chamber in a tangential manner so as to rotate a gasified fuel supplied therethrough in one direction;

a plurality of main air blowing holes having diameters, each formed through the outer wall of said cylindrical combustion chamber at a position adjacent to said fuel supplying tube with an orientation inclined to both of the rotating direction of the fuel and the blowing direction of a combustion flame; and

a number of auxiliary air blowing holes having diameters, each smaller than that of said main air blowing hole, provided through the outer wall of said combustion cham-

ber at positions downstream from said main blowing holes with orientations similar to those of said main air blowing holes.

4,687,437

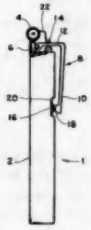
DISPOSABLE LIGHTER

Joseph Springer, P.O. Box 571, Onley, Va. 23418

Filed Mar. 25, 1986, Ser. No. 844,032

Int. Cl.[4] F23Q *1/02*

U.S. Cl. 431—277 **7 Claims**



1. A lighter comprising,

a liquid fuel reservoir disposed within a generally elongated cylindrical body,

valve means disposed at an upper end of the liquid fuel reservoir for releasing fuel from within the reservoir in a gaseous state through a nozzle extending upwardly from the reservoir,

spark generating means disposed adjacent the nozzle for lighting gaseous fuel escaping the reservoir through the nozzle,

valve actuating means, connected to the nozzle, for selectively opening and closing the valve means, and said valve actuating means including clip means, connected to the body adjacent the spark generating means, for releasably connecting the lighter to a user's clothing, wherein the valve actuating means and clip means are combined in the form an an L-shaped element having a shorter segment pivotally connected at the top of the body, the shorter segment having a medial opening through which the nozzle is fitted to provide an interconnection between the nozzle and the shorter segment, and a longer segment at right angle to the shorter segment, extending longitudinally along the body and terminating in a headed portion that passes against the body, means pivotally mounting the shorter segment to the body at an end of said shorter segment remote from said longer' segment, whereby movement of the L-shaped element translates into movement of the nozzle which acts to seat or unseat a valve within the valve means.

4,687,438

SHAFT MELTING FURNACE FOR MELTING METALS

Gunther Schmidt, Waldbrol, and Joseph W. M. Koch, Wiehl, both of Fed. Rep. of Germany, assignors to W. Strikfeldt & Koch GmbH, Fed. Rep. of Germany

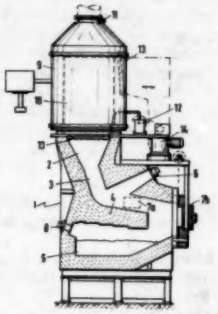
Filed Apr. 18, 1986, Ser. No. 853,629

Claims priority, application Fed. Rep. of Germany, Apr. 19, 1985, 3514681

Int. Cl.[4] F27D *19/00*

U.S. Cl. 432—57 **7 Claims**

1. A shaft melting furnace for melting metals with a heat-maintaining area receiving the molten bath comprising a charging shaft for supplying the melting stock. and a burner means providing heat to the melting stock, the charging shaft having a funnel-shaped construction and being connected to a melting zone of constant cross-section leading to a melting ramp included slightly with respect to the horizontal, with a transition zone therebetween formed by a lower end of the melting zone, the burner means being arranged in the vicinity of said zone and its action being fully directed onto the transmission, with a cleaning door in the vicinity of the melting ramp provided for removing residue, wherein the melting zone with melting ramp and heat-maintaining area are superposed.



4,687,439

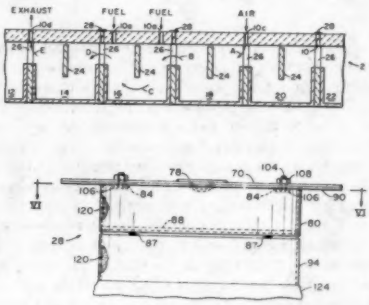
FURNACES FOR BAKING ANODES

Flavio Olivarez, Jr., College Station, and Richard J. Walla, Katy, both of Tex., assignors to Aluminum Company of America & Delta Refractories, Inc.

Filed Feb. 28, 1986, Ser. No. 834,523

Int. Cl.[4] F27B *7/00*; F27D *1/18*

U.S. Cl. 432—192 **12 Claims**



1. In a baking furnace for the baking of electrodes suitable for use in an electrolytic reduction cell, the improvement comprising an improved exhaust port plug adapted to fit into a port in said furnace which comprises:

(a) a shell having a cross-section approximating the cross-section of said port, said shell comprising two shell portions fastened together;

(b) a cover member on said shell having a dimension exceeding the dimension of the port;

(c) a gasket means on the underside of said cover member surrounding said shell and adapted to sealingly engage an external portion of the furnace, said gasket means comprising a plurality of layers comprising a first outer layer facing said packed ceramic fibers and capable of withstanding the operating temperature of said baking furnace, an inner insulating layer of ceramic fibers, and an outer sealing layer in contact with the underside of said cover member;

(d) a mat of packed ceramic fibers within the shell;

(e) retaining means to retain said mat of ceramic fibers within said metal shell comprising rod means fastened to

said shell which pass through said packed ceramic fibers at a point spaced from the ends of said shell where said shell portions are joined together; and

(f) means thereon for removably mounting said shell to said cover comprising strap means secured to an end of said shell and threaded mounting means engaging said strap means, said mounting means having a threaded end passing through an opening in said gasket means and said cover member to removably secure said cover member, said gasket means, and said shell together.

4,687,440

APPARATUS FOR HEATING CHARGING MATERIAL

William Wells, Sao Paulo, Brazil, assignor to Kortec AG, Zug, Switzerland

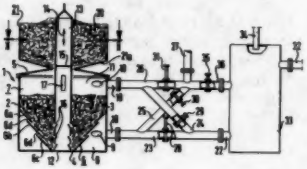
PCT No. PCT/EP85/00656, § 371 Date Aug. 5, 1986, § 102(e) Date Aug. 5, 1986, PCT Pub. No. WO86/03783, PCT Pub. Date Jul. 3, 1986

PCT Filed Dec. 2, 1985, Ser. No. 902,443

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1984, 3447267

Int. Cl.⁴ F72B *7/00*

U.S. Cl. 432—194 **10 Claims**



1. An apparatus for heating charging material, in particular metal scrap, by a heating gas, in particular hot waste gas from a smelting or refining unit, comprising: a charging material preheater in the form of a container for receiving the charging material to be heated up, said container having a closable bottom opening for emptying the container, a removable cover for introducing the charging material into the container, and a lower and an upper opening for introducing and removing the heating gas respectively, a grid inclined towards the bottom opening and dividing the container into a receiving space for the charging material and a free lower annular space into which the lower opening for the heating gas opens, said container being a hollow cylinder which passes through the cover and which is closed at a lower end thereof and in an upper region thereof, said hollow cylinder being displaceable to a raised and a lowered position and vice versa, in lowered position said cylinder closing the bottom opening and in raised position opening the bottom opening for emptying the container, the upper opening for the heating gas opening into an upper annular space formed between the charging material and the cover, said hollow cylinder having in the lower region a plurality of peripherally distributed gas orifices and, in the region of the upper annular space, at least one gas throughflow opening.

4,687,441

ELASTOMERIC SECURING MEANS FOR ORTHODONTIC APPLIANCES

Frank H. Klepacki, 6240 S. County Line Rd., Burr Ridge, Ill. 60521

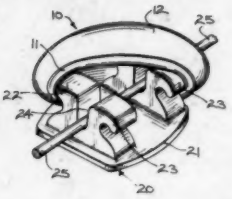
Filed May 10, 1985, Ser. No. 732,567

Int. Cl.⁴ A61C *7/00*

U.S. Cl. 433—8 **7 Claims**

1. In combination with an orthodontic appliance comprising at least one bracket which is attachable to a patient's tooth, has an archwire slot formed therein endwise of said bracket and has hook-shaped projections defining recesses therebelow on either side of said slot,

an elastomeric device including at least one unit having a closed loop portion stretchable over said projections and seated in said recesses, said recesses being at a level sufficiently low that said loop portion, upon being seated,



urges said archwire downwardly at points adjacent the two opposite ends of the bracket to hold the archwire down in said slot and a cap portion integrally molded with said loop portion for covering said bracket, said cap portion having a maximum circumferential dimension larger than that of said loop portion to facilitate accommodation of said projections in said cap portion.

4,687,442

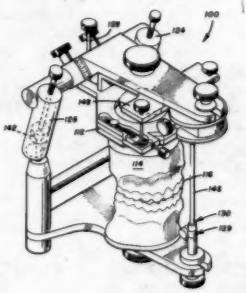
SURGICAL ARTICULATOR APPARATUS AND METHOD

Brian W. Wong, 1672 Toyon Ct., San Mateo, Calif. 94403

Filed May 1, 1985, Ser. No. 729,303

Int. Cl.⁴ A61C *11/00*

U.S. Cl. 433—63 **20 Claims**



1. An apparatus for mainpulating a dental cast, including a dental articular having a horizontal hinge axis comprising:

planar adjustment means mounted on said articulator for supporting said dental cast and for enabling said dental cast to be translated in two substantially orthogonal directions parallel to a substantially horizontal plane of motion and for enabling said dental cast to be rotated about a selected one of a plurality of axes, each axis being perpendicular to said plane of motion and passing substantially through said dental arch at a predetermined point, said planar adjustment means including means for selecting and providing a fixed pivot point about each of said selected axes passing substantially through said dental arch.

4,687,443

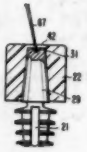
SUBMERGIBLE POST-TYPE DENTAL IMPLANT SYSTEM AND METHOD OF USING SAME

Thomas D. Driskell, Westerville, Ohio, assignor to Boehringer Mannheim Corporation, Warsaw, Ind.

Continuation of Ser. No. 486,903, Apr. 20, 1983, Pat. No. 4,547,157. This application Aug. 9, 1985, Ser. No. 765,064 The portion of the term of this patent subsequent to Oct. 15, 2002, has been disclaimed.

Int. Cl.[4] A61C *8/00*

U.S. Cl. 433—173 **19 Claims**



1. A submergible, post-type system for use in combination with an artificial dental element for implanting said artificial dental element into the bone structure of a human jaw, said system comprising:

an anchoring root member having a first end adapted for securely seating within said bone structure, and a second, opposite receiving end;

a temporary healing cap adapted to be received by said receiving end during healing of said bone structure around the first end of said anchoring root member; and

an implant head adapted to receive said artificial dental element and being receivable by said receiving end after removal of said temporary healing cap, said implant head having a subgingival base portion the size and shape of which is simulated by said temporary healing cap.

4,687,444

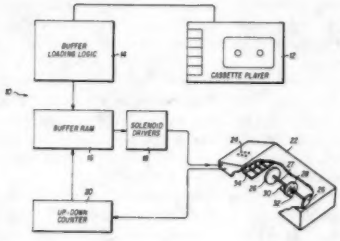
BRAILLE READING SYSTEM

H. Douglas Garner, Newport News, Va., assignor to The United States of America as represented by the Administrator of the National Aeronautics & Space Administration, Washington, D.C.

Filed Mar. 31, 1986, Ser. No. 846,430

Int. Cl.[4] G09B *21/00*; A61F *9/08*

U.S. Cl. 434—114 **25 Claims**



1. A braille reading method comprising the steps of:

providing a source of a text;

transferring said text from said source to a memory means;

converting said text to braille letters one letter at a time;

energizing selectively a plurality of solenoids;

driving selectively a plurality of pins with said energized solenoids to form a braille letter;

moving a position sensor to drive friction wheels mounted on an axle;

rotating an optical pick-off wheel mounted on said axle by moving said position sensor;

producing a series of optical pulses;

converting said light pulses to an electric distance signal;

counting said distance signals; and

changing said formed braille letter to the prior or subsequent braille letter relative to a decrease or increase in said counted distance signals.

4,687,445

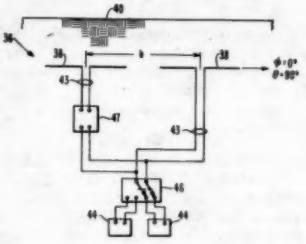
SUBSURFACE ANTENNA SYSTEM

John C. Williams, Moorestown, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Feb. 20, 1981, Ser. No. 236,244

Int. Cl.[4] H01Q *0/4*

U.S. Cl. 343—719 **27 Claims**



1. A subsurface antenna system having a radiation pattern exhibiting improved directivity in the free space above a subsurface comprising:

first and second radiation elements identically oriented and buried within a semi-infinite dissipative medium and adapted to radiate signals at a frequency in free space adjacent said semi-infinite dissipative medium;

means coupled to said radiating elements for applying said signals with a selected relative phase therebetween;

said radiating elements comprising conductors totally covered with insulating material so that said conductors are totally insulated from the medium;

said radiating elements having their respective centers spaced apart by at least one quarter free space wavelength of said frequency; and

said spacing and relative phase being further chosen to enhance the desired directivity of said antenna in free space.

4,687,446

SEGMENTED CONSTRUCTION FOR ELECTRICAL CONNECTOR ASSEMBLY

Norman R. Birch, Jacobus; William V. Pauza, Palmyra, and Wilmer L. Sheesley, Dauphin, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Apr. 24, 1986, Ser. No. 855,876

Int. Cl.[4] H01R *13/73*

U.S. Cl. 439—553 **18 Claims**

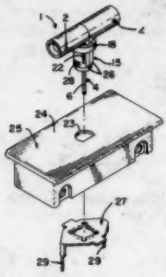
1. An electrical connector assembly, comprising:

an electrical conductor having elongated tap portions and electrical contacts on respective tap portions,

an insulative support for the conductor having insulative portions encircling respective tap portions of the conductor,

a hollow conductive shell having individual sleeve portions and a composite sleeve portion, the individual sleeve portions abutting one another and encircling respective insulative portions of the insulative support, the individual sleeve portions being provided with abutting edges, and the composite sleeve portion encircling a corresponding inslutative portion of the insulative support and being constructed of composite segments attached to corre-

sponding individual sleeve portions and abutting one another to form the composite sleeve portion, and means holding the composite segments for urging the com-



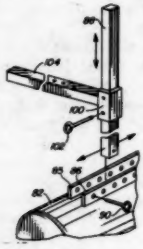
posite segments into abutment with one another without gaps therebetween, and for urging the abutting edges of the individual sleeve portions into abutment with one another without gaps therebetween.

4,687,447

ALL TERRAIN CONVERSION SYSTEM FOR THREE-WHEELED VEHICLES

Gerald J. Hannappel, 708 W. Solano Dr., Phoenix, Ariz. 85013

Continuation of Ser. No. 717,521, May 28, 1985, abandoned.
This application May 27, 1986, Ser. No. 868,119
Int. Cl.[4] B63H *21/175*
U.S. Cl. 440—11 **4 Claims**



1. Apparatus for converting an all terrain wheeled vehicle having front and rear wheels for travel across any of different surfaces by detachably attaching any of selected vehicle supporting equipment, said apparatus comprising in combination:

(a) rear support means secured to the rear of the vehicle above and rearward of the axis of rotation of the rear wheels of the vehicle, said rear support means including first and second opposed ends oriented and located laterally of the centerline of the all terrain wheeled vehicle;

(b) first and second horizontal extension means for engaging said first and second ends, respectively, said first and second ends including means for securing said first and second horizontal extension means;

(c) first and second vertical stanchion means for interconnecting said first and second horizontal extension means, respectively, with the vehicle supporting equipment;

(d) means for detachably attaching the lower ends of each of said first and second stanchion means to the vehicle supporting equipment;

(e) first and second adjustment means disposed at the interconnections between said first and second horizontal extension means and said first and second stanchion means, respectively, for vertically adjusting the relationship between the rear of the vehicle and the rear of the vehicle supporting equipment;

(f) a front support secured to the front of the vehicle above and rearward of the axis of rotation of the front wheel of the vehicle, said front support including third and fourth opposed ends oriented and located laterally of the centerline of the all terrain vehicle;

(g) third and fourth horizontal extension means for engaging said third and fourth ends, respectively, said third and fourth ends including further means for securing said third and fourth horizontal extension means;

(h) third and fourth vertical stanchion means for interconnecting said third and fourth horizontal extension means with the vehicle supporting equipment;

(i) further means for detachably attaining the lower ends of said third and fourth stanchion means to the vehicle supporting equipment; and

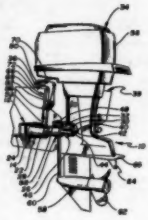
(j) third and fourth adjustment means disposed at the interconnection between said third and fourth horizontal extension means and said third and fourth stanchion means, respectively, for vertically adjusting the relationship between the front of the vehicle and the front of the vehicle supporting equipment.

4,687,448

OUTBOARD MOTOR TILT AND TRIM ADAPTOR APPARATUS AND SAFETY DEVICE

James G. Peirce, Rte. 1, Box 338, Madison Lake, Minn. 56063

Filed Dec. 13, 1985, Ser. No. 808,734
Int. Cl.[4] B63H *21/26*
U.S. Cl. 440—53 **6 Claims**



1. Apparatus for permitting an outboard motor, pivotally mounted with respect to the transom of a boat, to pivot upwardly and rearwardly when it encounters a submerged obstacle as the boat moves through the water, comprising:

(a) a base;

(b) an arm for suspending said base outboard of the transom, said arm being pivotally mounted, at one end thereof, with respect to the transom, and being pivotally attached, at an opposite end thereof, to said base, wherein said base is able to be swung toward, and engage, the transom and, when in engagement with the transom, is able to pivot relative thereto;

(c) an extension, having a distal end, carried by said base, said distal end, during operation of the boat, projecting rearwardly from the transom; and

(d) a transmission link pivotally connected, by a first end thereof, to said distal end of said extension, and, by a second end thereof, to the motor;

(e) wherein, when the motor operates to propel the boat through the water, said transmission link and extension are pivoted, relative to the motor and each other, such that said transmission link extends rearwardly from a location at which it is pivotally connected to the motor and generally parallel to, and coextensive with, said extension, and said base is swung into engagement with the transom; and

(f) wherein, when a submerged obstacle is encountered as the boat moves through the water, said base is swung out of engagement with the transom causing said extension to become non-parallel with said transmission link, said transmission link pivoting, thereafter, as a result of continued rearward exertion of force upon the motor by the

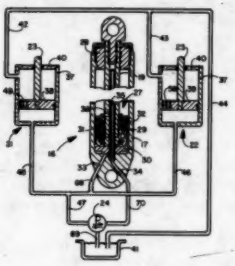
submerged obstacle, such that is extends forwardly from the location at which it is pivotally connected to the motor to allow the motor to pivot upwardly and rearwardly relative to the transom.

4,687,449

STAGED HYDRAULIC TRIM-TILT SYSTEM

William G. Fenrich, Oshkosh, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Dec. 20, 1985, Ser. No. 811,582
Int. Cl.[4] B63H *5/12*
U.S. Cl. 440—61 **6 Claims**



1. A hydraulic system for trimming and tilting an outboard propulsion unit pivotally mounted on a support member for mounting on a boat, said hydraulic system comprising:

(A) a first extensible hydraulic tilt piston-cylinder unit pivotally connected to said propulsion unit and to said support member;

(B) an extensible hydraulic trim piston-cylinder means separate from said first piston-cylinder unit and connected to one of said propulsion unit and said support member and having an extensible part for engaging the other of said propulsion unit and said support member;

(C) a reversible hydraulic pump means;

(D) a conduit means hydraulically connecting said tilt unit and said trim means to said hydraulic pump to supply said tilt unit and said trim means with hydraulic fluid to raise and lower said propulsion unit;

(E) a first pressure relief means to limit the maximum pressure of said hydraulic fluid supplid to said tilt piston-cylinder unit and said trim piston-cylinder means to a first predetermined level only when said trim piston-cylinder means has partially extended into a range between a first predetermined distance and a second predetermined distance greater than said first predetermined distance; and

(F) a second pressure relief means to limit the maximum pressure of the hydraulic fluid supplied to said tilt piston-cylinder unit to a second predetermined level greater than said first predetermined level only when said trim piston-cylinder means has extended at least said second predetermined distance.

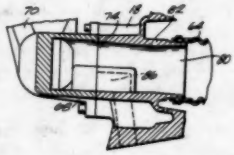
4,687,450

MARINE PROPULSION DEVICE EXHAUST SYSTEM

Gerald F. Bland, 2011 Fir St., Glenview, Ill. 60025, and Stephen R. Johnson, 37116 N. Adelphi, Waukegan, Ill. 60085

Continuation of Ser. No. 730,595, May 6, 1985, abandoned. This application Sep. 22, 1986, Ser. No. 910,325
Int. Cl.[4] B63H *21/32*
U.S. Cl. 440—89 **12 Claims**

1. A marine propulsion device comprising a water cooled internal combustion engine adapted to be located forwardly of a boat transom, a tiltable and stearable propulsion unit adapted to be located aft of the boat transom and including an exhaust outlet normally located underwater, and an exhaust passageway communicating between said engine and said exhaust outlet for conducting exhaust gases and coolant water away from said engine for discharge through said exhaust outlet, said exhaust passageway including structure adapted to be fixed relative to the boat transom and faciliting passage of exhaust gases and coolant water from forwardly of to aft of the transom, a first arcuately extending passageway portion extending forwardly from said structure and in which water flows due to centrifugal force, a second arcuately extending passageway portion which extends forwardly from said structure in later-



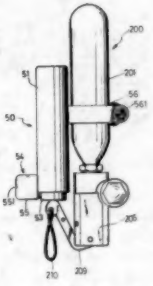
ally adjacent spaced relation to said first portion and which is substantially free of water, and means extending in said structure and communicating with said second portion and with the atmosphere independently of said exhaust outlet for discharging exhaust gases to the atmosphere and so as thereby to relieve back pressure in said exhaust passageway by conducting exhaust gases away from said second portion of said exhaust passageway and thereby to reduce exhaust gas flow through said exhaust outlet.

4,687,451

AUTOMATIC ACTUATION DEVICE FOR INFLATABLE LIFE-SAVING EQUIPMENT

Tsung H. Chen, P.O. Box 1-79, Taipei, Taiwan

Continuation-in-part of Ser. No. 794,546, Nov. 4, 1985, abandoned. This application Aug. 11, 1986, Ser. No. 895,493
Int. Cl.[4] B63C *9/14*
U.S. Cl. 441—94 **6 Claims**



1. An improved automatic actuation device for inflatable life-saving equipment comprising:

a housing firmly fitted on a sack of an inflatable life-saving equipment, having a connecting conduit communicating therebetween;

a compressed gas cylinder having a sealing cap being removably mounted on said housing;

a piercing pin for piercing said sealing cap provided under said sealing cap within said housing;

a L-shaped lever having a pivot below said piercing pin for moving said piercing pin to cause same to pierce said sealing cap when said lever is rotated, the bottom end of said piercing pin contacting the first end of said L-shaped lever, the second end thereof positioned above the first end; characterized in that

an automatic actuation device mounted on said compressed gas cylinder comprising:

an outer cylinder having a projecting pin at the lower portion thereof;

an inner cylinder having a projecting pin at the lower portion thereof, said inner cylinder being inserted into the outer cylinder except the portion of said projecting pin;

an actuating spring being compressively received inside said outer cylinder between the inside top portion of said outer cylinder and the outside top portion of said inner cylinder;

a replaceable water-soluble paper coil unit being surrounded on said two projecting pins upon said outer and inner cylinders being pressed and fastened together;

when submerged in water, said water-soluble paper coil unit is immediately broken to lose its fastening force to said outer and inner cylinders, the stored force in said actuation spring is released to push said inner cylinder downwards and thus makes said second end of L-shaped lever rotate in counter-clockwise direction around its pivot so as to cause said first end of said L-shaped lever to drive said piercing pin to pierce said sealing cap, the gas contained in said compressed gas cylinder being induced into the sack of the life-saving equipment.

4,687,452

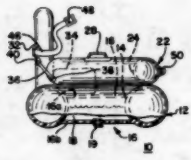
GAS-INFLATABLE, FLOATING, PORTABLE SEAT

Diane H. Hull, 1491 Ashland, #25 E, DesPlaines, Ill. 60016

Continuation-in-part of Ser. No. 752,610, Jul. 8, 1985, Pat. No. 4,601,667. This application Jul. 21, 1986, Ser. No. 888,584

Int. Cl.⁴ B63C *35/74*

U.S. Cl. 441—131 **10 Claims**



1. A gas-inflatable, floating, portable seat for supporting a person on the water, said seat comprising:

a first, generally annular-shaped, lower inflatable float chamber defining a compartment for said person and adapted to provide bouyancy when inflated and placed in water;

a water ballast compartment inside said lower float chamber;

a second, generally annular-shaped, upper inflatable float chamber mounted on top of said first float chamber formed with an open segment on a back side thereof and forming arm rests on opposite sides of said open segment;

a separately inflatable seat cushion adapted to be detachably mounted on said lower float chamber adjacent said open segment of said upper float chamber, said seat cushion suitable for use as a cushion while detached from said float chamber;

an upstanding inflatable seat back projecting upwardly of said first float chamber mounted in said open segment and attached to said first float chamber; and

securement means for detachably securing said seat cushion in place on said lower float chamber adjacent said open segment of said upper float chamber.

4,687,453

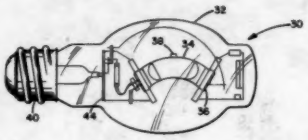
METHOD AND APPARATUS FOR POSITION ORIENTATION OF A METAL HALIDE LAMP BASE ASSEMBLY

Ronald C. Lekebusch, Goffstown; John T. O'Neil, Jr., Manchester, and Martin E. Muzeroll, Merrimack, all of N.H., assignors to GTE Products Corporation, Danvers, Mass.

Division of Ser. No. 810,953, Dec. 19, 1985. This application Nov. 28, 1986, Ser. No. 920,816

Int. Cl.⁴ H01J *9/30, 9/42*

U.S. Cl. 445—4 **7 Claims**



1. A method for position orienting a base assembly with respect to a curved arc tube of a high intensity discharge lamp, said base assembly including a base shell having an eyelet and a locator structure attached thereto, said method comprising the steps of:

providing within said discharge lamp an arc tube support structure coplanar with said arc tube;

providing means for welding said locator structure to said base shell, said welding means capable of separately receiving and supporting each of said lamp and said locator structure;

disposing said locator within said welding means and positioning said lamp within said welding means such that said base shell and said locator are in operative contact before welding;

providing a light source proximate to said welding means and aligning the light beam of said light source perpendicular to both the longitudinal axis of said lamp and to the plane formed by said arc tube and said locator structure;

providing a screen opposite said lamp such that a shadow image of said arc tube support structure is formed thereon when the light beam passes through the center of the neck of said lamp and impinges on said screen;

rotating said lamp radially within said welding means until the plane formed by said arc tube and said support structure is perpendicular to said arc tube-locator plane; and

activating said welding means to weld said locator structure to said base shell, thereby forming a base assembly that is position oriented with respect to said arc tube.

4,687,454

METHOD AND DEVICE FOR HEATING THE ELECTRODES OF AN ELECTRON GUN DURING ITS MANUFACTURE

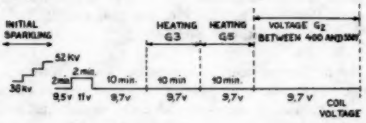
Giuliano Giudici, Rome, Italy, assignor to Videocolor, Montrouge, France

Filed Jun. 18, 1986, Ser. No. 875,730

Claims priority, application France, Jun. 21, 1985, 8509502

Int. Cl.⁴ H01J *9/39, 9/44*

U.S. Cl. 445—5 **10 Claims**



1. Method for heating the first electrodes of two electrostatic lenses of the bi-potential types of an electron gun forming part

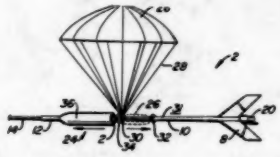
of a cathode ray tube, this heating being carried out during the manufacture of the tube, the first electrodes of these two lenses being brought to the same potential and the second electrodes also being brought to a same potential, but of a value different to that of the first, method in which, for the heating, use is made of the electrons produced by the gun, wherein the heating of the first electrode of each lens is localized at its end adjacent to the second electrode of this same lens.

4,687,455

FLYING MODEL ROCKET AND METHOD OF RECOVERY

Ron Sculatti, 1567 Railroad Ave., St. Helena, Calif. 94574

Filed Oct. 22, 1985, Ser. No. 790,296
Int. Cl.[4] A63H *27/01, 27/127, 33/20*
U.S. Cl. 446—52 **14 Claims**



1. A model rocket comprising:

a body including telescoping segments, the telescoping segments being displaceable from a collapsed condition to an extended condition;

a model rocket engine, including an ejection charge, secured to a base end of the body;

a fin mounted to the body to stabilize the rocket during flight; and

a recovery system mounted to and external of the body, the recovery system including a collapsible recovery surface secured to a first of said telescoping segments and a recovery surface containment structure means, secured to a second of said telescoping segment, for maintaining the recovery surface in a stowed condition external of the body when the first and second telescoping segments are at least partially telescopically retracted and for releasing the recovery surface when the first and second segments are telesopically extended by the action of the ejection charge of the rocket engine so the recovery surface becomes deployed and the model rocket has controlled descent.

12. A model rocket recovery method for use with a model rocket of the type having a body adapted to use a model rocket engine at a base end of the body, the engine of the type including an ejection charge, comprising the following steps:

positioning a collapsible recovery surface into a stowed orientation external of a first telescoping body segment, the recovery surface connected to the first body segment;

at least partially telescopically retracting said first and a second telescoping body segments so a recovery surface containment means, mounted to the second body segment, maintains the recovery surface in said stowed orientation;

actuating the model rocket engine so to propel the model rocket; and

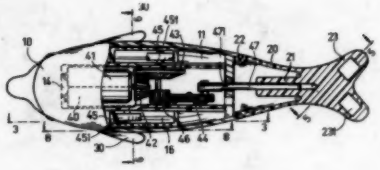
telescopically extending the first and second segments after and due to the ignition of the ejection charge to remove the recovery surface containment means from the recovery surface so the recovery surface is no longer maintained in said stowed orientation so the recovery surface is deployed to slow the descent of the model rocket.

4,687,456

IRREGULAR MOTION TYPE FISH SHAPE DIVING TOY

Ming-Jeng Wang, P.O. Box 10780, Taipei, Taiwan

Filed Jan. 23, 1986, Ser. No. 821,533
Int. Cl.[4] A63H *23/14*
U.S. Cl. 446—158 **2 Claims**



1. A diving fish toy comprising:

(a) a hollow head body portion;

(b) a hollow flexible tail body portion connected to said head body portion forming a closed space therein;

(c) a battery chamber formed in said closed space for holding batteries;

(d) a propulsion means in said closed space for propelling said fish toy through water, comprising: an electric motor operatively connected to a revolving drum through a gear set, and a connect lever having one end pivoted eccentrically to said drum;

(e) a pair of roller cabinets, each located at a respective side of the center of gravity of said toy, each cabinet further being elongated and extending from said head body portion toward said tail body portion and having one end ahead of the center of gravity and a second end behind the center of gravity;

(f) a pair of rollers, each located in a respective roller cabinet for changing the center of gravity of said fish toy so as to cause said fish toy to move in an irregular pattern;

(g) a support bracket located in said head body portion for supporting an intermediate portion of said connect lever;

(h) a casing means inside said tail body portion for connecting said tail body portion with a second end of said connect lever;

(i) a pair of tail fins integral with said tail body portion, each having a hole and a pivotable supplementary fin therein, said supplementary fin opening said hole as said tail fin moves in one direction and closing said hole as siad tail fin moves in a second direction; and

(j) circuit means including a switch for electrically connecting said motor to said batteries when said batteries are positioned in said battery chamber, whereby when said fish toy is placed in water and said switch is turned on said motor drives said gear set, said revolving drum and said connect lever, said connect lever privoting at said support bracket causing said tail body to flex and propell said fish toy through said water.

4,687,457

HAND-HELD PUPPET WITH PSEUDO-VOICE GENERATION

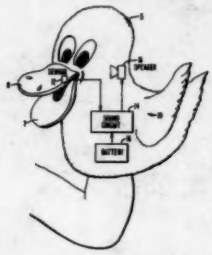
Ronald E. Milner, Grass Valley, Calif., assignor to Axlon, Inc., Sunnyvale, Calif.

Filed Aug. 26, 1985, Ser. No. 769,116
Int. Cl.[4] A63H *3/28*
U.S. Cl. 446—175 **20 Claims**

1. In a hand-operated puppet of the type having a hand-movable part to simulate animation, sound-generating apparatus coordinated for operation with said animation to produce an audio signal capable of being converted to sound by transducer means mounted in the puppet, the sound-generating apparatus comprising:

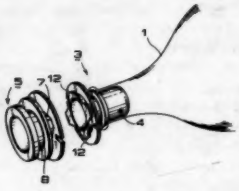
sensor means mounted in association with the hand-movable

part to produce a first signal having an amplitude that is varied by movement of the hand-movable part;
generating means for producing a tone signal; and



modulator means coupled to receive and combine the first and the tone signals, producing therefrom the audio signal.

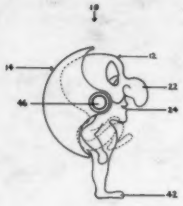
4,687,458
CAP PLUG FOR A BALLOON
Koichiro Handa, Hakodate, Japan, assignor to Handa Kikai Kigu Kabushiki Kaisha, Hokkaido, Japan
Filed Sep. 15, 1986, Ser. No. 907,518
Int. Cl.[4] A63H *3/06*
U.S. Cl. 446—222 **6 Claims**

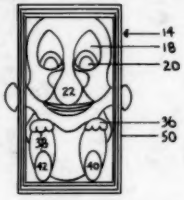


1. A cap plug for a balloon, comprising
a substantially cylindrical body having one end closed;
said body having a vent hole provided at a position close to the closed one end and extending through a peripheral wall thereof and a plurality of outwardly directed engaging pawls formed on the foremost end of an open end;
a substantially cylindrical attachment arranged coaxial with said body and having at one end an engaging means which disengageably engages said engaging pawls;
said engaging means having a cut guide having a configuration in coincidence with said engaging pawl, and an engaging groove wherein said engaging pawl is within said cut guide, said body is rotated relatively to said attachment whereby said engaging groove engages said engaging pawls to connect said body and said attachment each other; and
a length of thread having a predetermined length one end of which is secured to said body and the other end secured to said attachment.

4,687,459
BABY TOY
G. Jeffrey Lockett, 100 South Third, St. Charles, Mo. 63301
Filed Nov. 6, 1985, Ser. No. 795,546
Int. Cl.[4] A63H *3/04*
U.S. Cl. 446—268 **21 Claims**

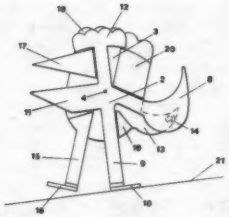
1. An humanoid toy device comprising: a shell portion including a plurality of arcuate shell segments; a humanoid figure including a body portion and a leg portion, said figure in a first position located within said shell portion and being covered thereby; each of said arcuate segments being pivoted about a pair of ears on said humanoid figure; said arcuate segments





being pivotable about said ears to reveal some or all of the humanoid body.

4,687,460
GRAVITATIONALLY ANIMATED TOY BIRD
Frank J. Katzmarzik, 206 Union Ave., Belleville, Ill. 62220
Filed Mar. 25, 1986, Ser. No. 843,519
Int. Cl.[4] A63H *15/02*
U.S. Cl. 446—316 **5 Claims**



1. A gravitationally animated toy bird having three body members axially affixed by a pivot pin; the three body members comprising:
(a) An ornamental body side member having a weighted tail at its bottom rear and a simulated plume at its top;
(b) An inner body member axially affixed to the ornamental side member so as to pivot or swing about the axis of the pivot pin, said inner body member comprising four radial appendages defining, (i) a single rear leg member having at its base a flat member defining a webbed foot with toes directed towards the rear of the webbed foot, (ii) a lower mandible, (iii) an inner tail member, and (iv) an inner plume member; the body members further comprising;
(c) a functional body side member axially affixed about the pivot pin to sandwich the inner body member between said functional body side member and said ornamental body side member while secured to remain stationary relative to the ornamental body said member but pivotally movable relative to the said inner body member, said

functional body side member comprising the following appendages; (i) a front leg member having a webbed foot member with toes directed forward of the leg member, (ii) a top mandible member, (iii) a top outer plume member, (iv) an abutment opposite of the top beak member, the two of which create a slot within which the inner plume member abuts and thereby has its degree of movement restricted, (v) a weighted tail member at its rear in parallel relationship to the weighted tail member of the ornamental body side member, and (vi) an abutment to define the maximum rear movement of the rear leg member appended to the inner body member, said forward leg member being longer than said rear leg member in length, and said forward leg representing an abutment defining the maximum forward movement of the pivotally attached rear leg member of the inner body; whereby said gravitationally animated toy bird can simulate a bird walking down an incline with its tail feathers flicking, its mandibles opening and closing, and its plume feathers moving backward and forward.

4,687,461

MULTIPLE ROTARY DRIVE SYSTEM FOR A TEXTILE-WORKING MACHINE

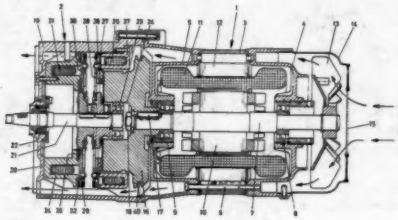
Herbert Palloch, Schwetzingen/Baden, and Hans Erndt, Weisloch, both of Fed. Rep. of Germany, assignors to Frankl & Kirchner GmbH & Co KG, Schwetzingen/Baden, Fed. Rep. of Germany

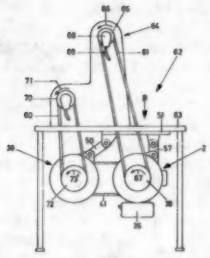
Filed May 12, 1986, Ser. No. 862,058

Claims priority, application Fed. Rep. of Germany, May 10, 1985, 3516832

Int. Cl.[4] F16H *7/02*; B60K *41/24*

U.S. Cl. 474—148 **12 Claims**





1. A multiple rotary drive system for a textile-working machine, comprising:

first and second clutch-brake units, each clutch-brake unit having a rotatable flywheel, a non-rotatable brake surface, a rotatable shaft to be driven, whereby the rotatable shaft can be connected to a textile-working machine as a rotary drive system therefor, at least one coupling disc connected to the shaft for rotation therewith, first engaging means for controllably engaging one of said at least one disc with the flywheel for rotatably driving the shaft therefrom, and second engaging means for controllably engaging one of said at least one disc with the brake surface for braking rotation of the shaft therefrom;

drive means connected to the flywheel of the first clutch-brake unit for rotationally driving the flywheel thereof, whereby the drive system can be driven by a continuously-rotating shaft of a continuously-operating electric motor;

belt-receiving means about the flywheel of each clutch-brake unit for receiving a belt; and

a belt about the belt-receiving means for coordinate rotation of the flywheels of said first and second clutch-brake units.

4,687,462

PROCESS FOR THE AUTOMATIC INSERTION OF BOX-SHAPED BAGS

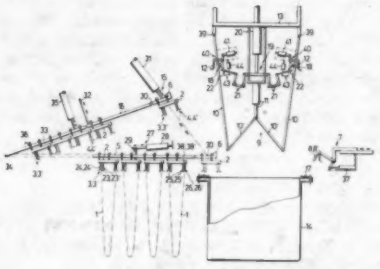
Siegfried Rewitzer, Ihrlerstein, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Continuation of Ser. No. 459,356, Jan. 20, 1983, abandoned. This application Nov. 14, 1985, Ser. No. 798,235

Claims priority, application Fed. Rep. of Germany, Jan. 30, 1982, 3203071

Int. Cl.[4] B31B *7/00*

U.S. Cl. 493—100 **2 Claims**

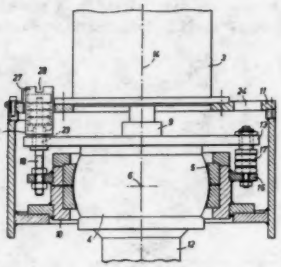


1. A process for the automatic insertion of box-shaped bags made of flexible packaging material into large box-shaped containers for depositing and compressing of fiber tow or staple fibers, each container having side walls and a generally flat bottom wall, the process comprising the steps of suspending a box-shaped bag in a generally vertical position with two opposing side faces extended and the other two side faces and bottom of the bag folded together, storing a plurality of such suspended bags next to one another, transporting each suspended bag to a bag transfer station, partially opening the bag at the transfer station, positioning a bag spreading device inside the partially open bag, taking the bag on the spreading device and inserting the partially open bag with the bag spreading device therein into a container, spreading the side faces of the bag open into engagement with the inside of the side walls and flat bottom wall of the container, resiliently retaining the bag within the container and thereafter collapsing and then removing the spreader device to thereby transfer the bag to the container, and partially cutting each corner of the bag at the top bottom thereof to thereby form marginal side flaps at the top of the bag.

4,687,463
CENTRIFUGAL DECANTER OF THE PENDULOUS TYPE

Jacques Simonnet, Saint-Remy-Les-Chevreuse, France, assignor to Cogema, Velizy-Villacoublay, France

Filed Oct. 16, 1985, Ser. No. 787,810
Claims priority, application France, Jul. 1, 1985, 85 10015
Int. Cl.[4] B04B 9/00
U.S. Cl. 494—83 12 Claims

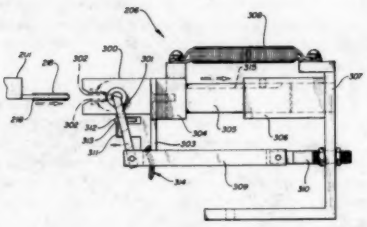


1. In a centrifugal decanter of the pendulous type, incorporating a rotor which comprises a rotating vessel and a vertical rotating shaft connecting said vessel to a motor for driving in rotation, this shaft being suspended by means of a swivel joint centered on its axis, supported by a fixed connected seat and supporting the shaft via a bearing which allows rotation thereof in the swivel joint, the active surfaces of the swivel joint and of its seat being limited to relatively narrow equatorial spherical zones, a plurality of compression springs, means mounting said springs at regularly spaced locations about said shaft, each of said mounting means comprising a first element secured to said seat and a second element secured to said joint with one of said springs biased between said elements so as to exert an upwardly directed restoring force on said joint, said springs ensuring the return of said joint into neutral position and compensating at least partially for the weight of the members supported by the swivel joint.

4,687,464
ZERO INSERTION FORCE SOCKET FOR PHOTOACTIVATION PATIENT TREATMENT SYSTEM

Vernon H. Troutner, St. Petersburg, Fla., assignor to McNeilab, Inc., Fort Washington, Pa.

Continuation-in-part of Ser. No. 665,817, Oct. 29, 1984, Pat. No. 4,573,962. This application Feb. 27, 1986, Ser. No. 834,259
Int. Cl.[4] A61M 37/00; H01R 13/62
U.S. Cl. 604—4 9 Claims



1. An improved system for inserting a circuit board into electrical contact with a socket, wherein said socket is a zero insertion force socket comprising:

(a) spring contacts affixed to said socket for electronically communicating with said circuit board;

(b) means for slidably affixing said socket to a support;

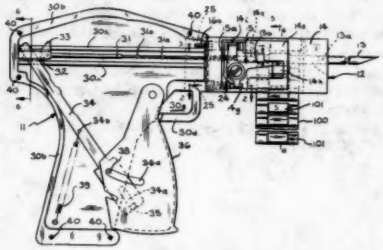
(c) biasing means for biasing said socket in a first postion wherein said spring contacts are open, said socket adapted to being slidably urged into a second position by said circuit board wherein said spring contacts are closed and in electrical communication with said circuit board; and

(d) contact operating means pivotably mounted on said support for closing said spring contacts when said socket is slidably urged from the first to the second position to place said contacts into electrical contact with said circuit board and for opening said contacts when said socket is slidably urged from said second position to said first position by said biasing means.

4,687,465
AUTOMATIC CLIP OR PELLET CARRIER FED PELLET IMPLANTER APPARATUS

Gordon E. Prindle, Schaumburg, and Thomas J. Kelm, Forest Park, both of Ill., assignors to Ideal Instruments, Inc., Chicago, Ill.

Filed Apr. 25, 1986, Ser. No. 855,908
Int. Cl.[4] A61M 5/00
U.S. Cl. 604—61 14 Claims



1. A hand held gun apparatus for implanting a pellet into an animal which comprises:

(a) a hollow needle defining a barrel for implanting the pellet into the animal;

(b) a head means on the gun apparatus supporting the needle with an opening through the assembly into the barrel and having a slot for supporting a linearly moveable carrier along a first axis perpendicular to the barrel of the needle, the carrier having multiple spaced apart cam means on one side, and having multiple parallel chambers each adjacent a cam for carrying a pellet;

(c) a pistol grip means supporting the head means;

(d) a drive rod linearly moveable through an opening between the ends of the head means and into the barrel from the pistol grip;

(e) an actuating means mounted in the pistol grip for moving the drive rod into and out of the barrel;

(f) trigger means mounted on the pistol grip actuatable by the hand for moving the actuating means and thus drive rod into and out of the barrel;

(g) lever means pivotably mounted on the head means actuated by movement of the drive rod into and then from the barrel wherein the lever means is rotated into position over the cam means on the outside of the carrier as a result of the movement of the drive rod into the barrel to implant a first pellet and then the lever means acts on the cam means to move the carrier along the first axis upon release of the trigger means and retraction of the drive rod from the barrel to move a new chamber and pellet into registry between the drive rod and the barrel so that the drive rod can pass through the new chamber and into and through the barrel to implant a second pellet in the animal; and

(h) spring means urging the lever means to move the carrier

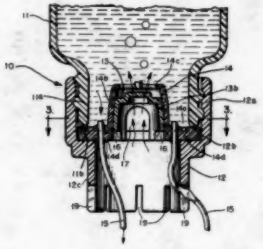
and the new chamber into position between the barrel and drive rod.

4,687,466

BREASTFEEDING ASSISTANCE DEVICE

Karl O. A. H. Larsson, Zug, Switzerland, assignor to ISG AG, Zug, Switzerland

Filed Dec. 5, 1985, Ser. No. 805,441
Int. Cl.[4] A61M *37/00*
U.S. Cl. 604—82 **12 Claims**



1. A device for delivering a liquid diet supplement to a nursing infant simultaneously with normal breastfeeding, comprising:

a non-collapsible container for holding the liquid supplement, said container having a neck portion defining a container opening which is downwardly directed during breastfeeding, said container being otherwise closed;

a fluid delivery mechanism comprising a valve mount having a first aperture formed therein through which the interior of said container is accessed for liquid supplement outflow, and a second aperture formed therethrough, and

a plurality of flexible valve members being interchangeably received on said valve mount to cover said second aperture, each said valve member being biased to close said second aperture and adapted to substantially prevent liquid supplement from flowing out of said container through said second aperture while permitting air to enter said container in response to a negative pressure within said container sufficient to overcome said valve member bias caused by liquid supplement outflow from suckling, said bias being related to a desired level of suckling effort,

each said valve member carrying tubing having a first end communicating through said opening via said first aperture with said liquid supplement in said container interior, and a second end which is positioned adjacent a breast nipple for suckling, said second end being sized to fit into the infant's mouth simultaneously with the breast nipple, said tubing of each said valve member providing a rate of delivery for a given suckling effort that is different from the rate of another valve member, said plurality of valve members thereby permitting control of liquid supplement delivery by selection of a valve member with the appropriate delivery rate; and

means for removably attaching said fluid delivery mechanism to said neck portion and sealing said opening.

4,687,467

ONE-TIME USE MEDICAL SYRINGE INVENTION

Bozena Cygielski, Chicago, Ill., assignor to C.T.F. Research Company, Chicago, Ill.

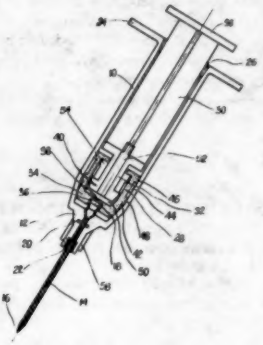
Filed Jun. 11, 1986, Ser. No. 872,934
Int. Cl.[4] A61M *5/00*
U.S. Cl. 604—110 **14 Claims**

1. A medical injection syringe comprising:

a cylinder having an open end and a closed end and a cutting edge protruding into the interior of the cylinder at the closed end;

a hollow needle mounted in the closed end of the cylinder in communication with the interior of the cylinder;

a piston adapted to fit in the interior of the cylinder through the open end thereof and in sealing engagement with the cylinder for forcing fluid through the needle as the piston is pushed towards the closed end of the cylinder, the



piston having a piston surface facing the cutting edge as the piston approaches the closed end of the cylinder;

means surrounding the cutting edge for protecting the piston surface from being cut when the piston approaches the closed end of the cylinder; and

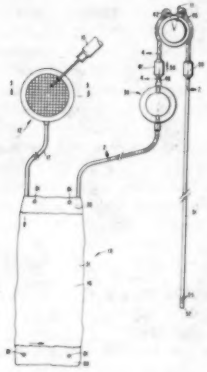
pushing means for forcing the piston toward the closed end of the cylinder so as to force the fluid out the needle and such that when the piston engages the cutting edge, an opening hole is cut in the piston surface.

4,687,468

IMPLANTABLE INSULIN ADMINISTRATION DEVICE

Cesare Gianturco, Champaign, Ill., assignor to Cook, Incorporated, Bloomington, Ind.

Continuation of Ser. No. 656,346, Oct. 1, 1984, abandoned. This application Jul. 25, 1986, Ser. No. 888,633
Int. Cl.[4] A61M *5/00*
U.S. Cl. 604—153 **6 Claims**



1. An implantable device for administering a measured amount of liquid drug comprising:

a container of flexible material for storing the liquid drug;

a second container connected to said first mentioned con-

tainer by tubing, said second container being made from inert plastic, a metal housing surround the inert plastic and maintaining it in a compressed condition, said housing having a metal grill permitting injection of a needle through the grill and the inert plastic into the second container for percutaneously filling the first mentioned container, a metal disc on the inside of said second conatiner as a stop for a needle;

a pump including a pair of cup-shaped members, joined together at their peripheries, each of said cup-shaped members having a concave side and a convex side, the concave sides of said cup shaped members facing toward one another, the convex sides of said cup-shaped members facing away from each other; and,

tubing means connecting said first mentioned container and said pump and leading away from said pump for discharge in the body.

4,687,469

DEVICE FOR SLITTING INTRODUCERS FOR PACEMAKER ELECTRODES

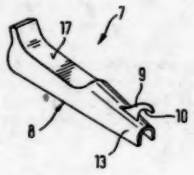
Peter Osypka, Basler Strasse 109, D-7889 Grenzach-Wyhlen, Fed. Rep. of Germany

Filed May 31, 1985, Ser. No. 740,013

Claims priority, application Fed. Rep. of Germany, Jun. 1, 1984, 3420455

Int. Cl.[4] A61M *25/00*

U.S. Cl. 604—161 **10 Claims**



1. A device for slitting open a tubular introducer serving to facilitate insertion of a pacemaker electrode, a catheter or an analogous elongated slender object into the body of a patient and having an exposed end portion from which the object extends, said device comprising an elongated manually deformable elastic supporting portion having a first end, a second end and a longitudinally extending slot between said ends so that it can be slipped sideways onto the object to at least partially surround the object adjacent the exposed end portion of the introducer and to facilitate the deformation of said supporting portion; and a knife provided on said supporting portion and having a cutting edge facing one of said ends to face the end portion of the introducer when the supporting portion at least partially surrounds the object so that the introducer can be severed by moving it relative to the object against the cutting edge while the supporting portion is deformed by hand between said knife and the other of said ends and is thereby maintained in frictional engagement with the object.

4,687,470

CATHETER FOR NASOGASTRIC INTUBATION

Yosuke Okada, Tokyo, Japan, assignor to Sherwood Medical Company, St. Louis, Mo.

Filed Dec. 16, 1985, Ser. No. 809,534

Int. Cl.[4] A61M *25/02*

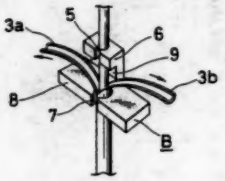
U.S. Cl. 604—171 **2 Claims**

1. A medical intubation assembly a distal end of which is adapted to be inserted internally of a patient, said assembly comprising

a relatively soft catheter of a first relatively small diameter and having a length to reach from externally of the patient to a desired point internally of the patient;

a relatively rigid longitudinally splittable insertion tube of a second and relatively larger diameter and having an internal bore slidably receiving and encasing said catheter, said insertion tube having, and being splittable along, two opposed longitudinally extending lines of weakness along the full length thereof to facilitate splitting thereof for withdrawal from the patient and removal from about said catheter; and

a catheter fixing means adapted to be removably fixed adjacent a proximal end of said catheter externally of the patient for fixedly positioning said catheter during withdrawal of said insertion tube from the patient and removal of said insertion tube from about said catheter, said catheter fixing means including a plate means adapted to abut the patient adjacent the location of insertion of the intubation assembly, the catheter fixing means including a catheter receiving groove having a diameter slightly smaller than said first diameter for pinching engagement with said catheter during withdrawal and removal of said insertion tube from about said catheter, portions of said plate means positioned on opposite sides of said groove to abut each of the split halves of said insertion tube upon withdrawal thereof to assist in separating and splitting of said insertion tube along said longitudinally extending lines.



4,687,471

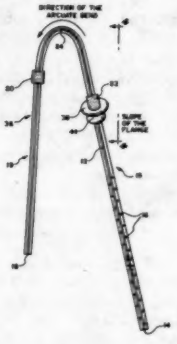
PERITONEAL DIALYSIS CATHETER

Zbylut J. Twardowski; Karl D. Nolph, and Ramesh Khanna, all of Columbia, Mo., assignors to Curators of the University of Missouri, Columbia, Mo.

Continuation-in-part of Ser. No. 729,185, May 1, 1985, abandoned. This application Feb. 6, 1986, Ser. No. 826,823

Int. Cl.[4] A61M *25/00*

U.S. Cl. 604—175 **11 Claims**



1. A peritoneal catheter which comprises a flexible catheter tube having a proximal end portion which, in use, projects outwardly from the abdominal cavity of a patient and a distal

end portion which, in use, projects inwardly into the peritoneal cavity of the patient, the improvement comprising:

said catheter tube defining in its natural, unstressed condition, a bent segment between the proximal end portion and the distal end portion, said bent segment, in use, extending through the subcutaneous tissue and rectus muscle of the abdominal wall, through the posterior rectus sheath and into the peritoneal cavity.

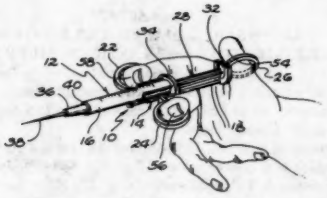
and further including a flange circumferentially surrounding said catheter tube, said flange extending at a nonperpendicular angle relative to the axis of said catheter tube and, in use, secured against the posterior rectus sheath of the patient, the slope of said flange extending in a direction transverse the direction of said bent segment to maintain the distal end portion pointed in a caudal direction within the peritoneal cavity of the patient while the proximal end projects, when viewed by an on-looker, downwardly and at an angle relative to the midline of the patient.

4,687,472

INJECTION ASSISTING APPARATUS

Daniel A. Gross, 20218 Wells Dr., Woodland Hills, Calif. 91364

Filed Nov. 12, 1986, Ser. No. 929,611
Int. Cl.[4] A61M *5/315*
U.S. Cl. 604—223 **23 Claims**



1. An apparatus for making subcutaneous injections, comprising:

a disposable syringe including a barrel having a barrel flange at one end thereof and a barrel shoulder at an opposite end, and a plunger having a first end positioned in the barrel for reciprocation therein and a second end external to the barrel and having a head connected thereto;

a pair of finger rings;

means for positioning the pair of finger rings in a fixed position with respect to the syringe barrel, the finger rings being disposed in generally the same plane and on opposite sides of the disposable syringe;

a shaft slidingly engaging the finger ring positioning means along a line offset from the syringe but parallel to its longitudinal axis;

means attached to the shaft for engaging the syringe plunger head; and

a thumb ring affixed to the plunger head engaging means, wherein the thumb ring is rotated with respect to the plane of the finger rings to be oriented in a plane different from that of the finger rings;

whereby any movement of the thumb ring relative to the finger rings induces corresponding movement of the plunger relative to the barrel of the syringe.

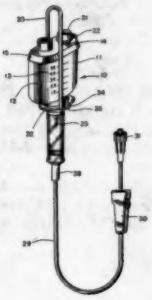
4,687,473

SELF-CONTAINED SECONDARY SOLUTION SET

Kenneth Raines, Bethlehem, Pa., assignor to Burron Medical Inc., Bethlehem, Pa.

Filed Feb. 6, 1986, Ser. No. 826,096
Int. Cl.[4] A61M *5/14*
U.S. Cl. 604—251 **11 Claims**

1. A self-contained solution set comprising a solution container having a filtered air vent and a valved filling port to enable filling the container by means of a syringe without needle, a drip device on the bottom of the container, a drip chamber means on the bottom of the container enclosing the drip device, an infusion tube assembly connected to the bottom of said drip chamber means, a hanger means for the solution set, said hanger means supporting said solution container by an adjacent support member, said support member having a



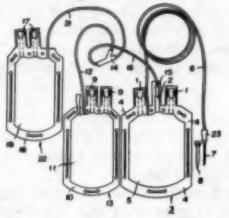
hanger hinged thereto, the support member of the hanger means comprising a support ring at the bottom of the solution container surrounding and encircling the drip chamber means, and said hanger comprising a hanger loop hingedly attached to the support ring by integral flexible hinges and having side portions adapted to straddle side walls of the solution container.

4,687,474

JUNCTION FOR MEDICAL INSTRUMENTS

Nobuyasu Takanashi, Fujinomiya, Japan, assignor to Terumo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 742,653, Jun. 10, 1985, abandoned, which is a continuation of Ser. No. 426,204, Sep. 28, 1982, abandoned. This application Dec. 20, 1985, Ser. No. 815,176
Claims priority, application Japan, May 28, 1982, 57-89863
Int. Cl.[4] A61M *5/185*
U.S. Cl. 604—257 **22 Claims**



1. A method of manufacturing a sterilized medical instrument including at least one pair of tubular members, each of said tubular members being made of a vinyl chloride polymer, said method comprising the steps of:

insertion of one of said tubular members of said at least one pair of tubular members into the other of said tubular members such that one of said tubular members overlaps the other over a portion of their respective lengths, the overlapping portion forming a junction portion at which said tubular members are to be connected;

injection of a vinyl chloride resin paste containing from 110 to 290 parts by weight of plasticizer per 100 parts by weight of said vinyl chloride resin between said tubular members along at least a portion of said junction portion

to form a joint, said vinyl chloride resin comprising particles having particle diameters between 0.02 and 20 μm;

first adhesion of said medical instrument including said tubular members with said paste therebetween by heating with the use of a hot mold or heating the atmosphere or a far-infrared heater; and

second adhesion of said adhered medical instrument in an autoclave containing pressurized steam to strengthen said joint at about 120° C. under a pressure of 1.5 to 1.7 atmosphere for about 30 minutes.

4,687,475

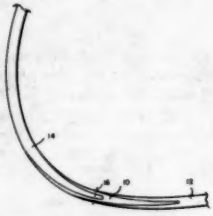
METHOD FOR SEQUENTIAL INTRAVENOUS INFUSION OF MULTIPLE FLUIDS

Henry T. Tai, Pacific Palisades, and Eric W. Brown, Redondo Beach, both of Calif., assignors to I-Flow Corporation, Torrance, Calif.

Continuation of Ser. No. 619,846, Jun. 12, 1984, abandoned. This application Apr. 7, 1986, Ser. No. 849,106

Int. Cl.⁴ A61M *5/14*

U.S. Cl. 604—248 **1 Claim**



1. A method for sequential intravenous administration of a plurality of fluid solutions, said method comprising:

providing a valve that provides continuous communication between an output and at least one of a plurality of inputs;

connecting a neutral solution to one input of said valve;

connecting each of said plurality of solutions to different inputs of said valve;

connecting a lumen of a catheter tube to the output of said valve; and

using an electronic processor to alternately switch said valve between the input connected to said neutral solution and one of said other plurality of inputs at predetermined intervals, said neutral solution being provided between said fluid solutions to prevent said fluid solutions from substantially mixing in said lumen of said catheter tube.

4,687,476

TOPICAL DRESSINGS

Eric Pailin, 43 Park Mount Drive, Macclesfield, Cheshire, England (SK11 8TM)

PCT No. PCT/GB84/00250, § 371 Date Mar. 14, 1985, § 102(e) Date Mar. 14, 1985, PCT Pub. No. WO85/00287, PCT Pub. Date Jan. 31, 1985

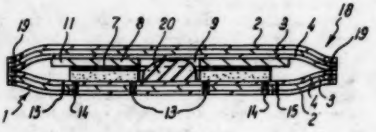
PCT Filed Jul. 11, 1984, Ser. No. 719,284

Claims priority, application United Kingdom, Jul. 14, 1983, 8319096

Int. Cl.⁴ A61F *13/02*

U.S. Cl. 604—307 **3 Claims**

3. A method of manufacturing topical dressings utilizing a continuous multi-layer strip having a continuous layer of a first foil and on one side thereof a laminated material comprising a layer of skin adhesive protected with a release film, said laminated material being cut away to define at successive locations spaced along the strip separate portions of said laminated material bounded by regions of said first foil, wherein said regions are free of skin adhesive, said portions each having a respective aperture therein, wherein a topical substance is introduced into each said aperture, and a continuous strip of a second foil is disposed over said laminated material and secured to said first foil around said portions so as to seal said apertures and thereby retain said topical substance within same, said multi-layer strip with said attached second foil being separable between said portions to define individual dressings



each containing said topical substance in a respective said aperture bounded by said material and sealed between said first and second foils, and said second foil being separable from said portion in such individual dressing structure so that said skin adhesive and the topical substance can be exposed for use.

4,687,477

DISPOSABLE DIAPER AND METHOD FOR INCORPORATION OF ELASTIC MEMBER INTO SUCH DIAPER

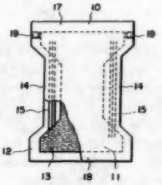
Migaku Suzuki; Satoshi Sasaki; Takashi Mitsuno, and Hiroyuki Inagaki, all of Ehime, Japan, assignors to Uni-Charm Corporation, Ehime, Japan

Division of Ser. No. 755,369, Jul. 16, 1985, Pat. No. 4,626,305, which is a continuation of Ser. No. 460,909, Jan. 25, 1983, abandoned. This application Aug. 22, 1986, Ser. No. 899,421

Claims priority, application Japan, Apr. 14, 1982, 57-61946

Int. Cl.⁴ A61F *13/16*

U.S. Cl. 604—385 A **4 Claims**



1. A disposable diaper including

(A) a water permeable topsheet,

(B) a water impermeable backsheet overlying said topsheet,

(C) an absorbent body fixedly interposed between said sheets and inwardly of the perimeter of said sheets so as to leave side flaps extending beyond the opposite outer edges of the absorbent body, and

(D) elastic means disposed between said sheets in each of said side flaps, each of said elastic means

(1) comprising a group of 3–45 elastic strings disposed in close parallel relationship to each other and in such a manner that the elastic strings are intrinsically separate from one another,

(2) being stretched at a stretching ratio of 100–400%, said elastic strings

(a) each being longitudinally extendable,

(b) each having a cross-sectional area of 0.03-0.45 mm^2,

(c) having a total cross-sectional area of 0.09-1.35 mm^2,

whereby the longitudinal lines of elasticity formed in said side flaps permit said slide flaps to effect a good fit around an infant's thighs.

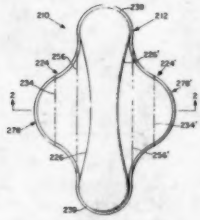
4,687,478
SHAPED SANITARY NAPKIN WITH FLAPS

Kees J. Van Tillburg, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 591,620, Mar. 20, 1984, abandoned. This application Oct. 17, 1985, Ser. No. 789,914

Int. Cl.[4] A61F *13/16*

U.S. Cl. 604—387 **34 Claims**



1. A sanitary napkin comprising:

a. An absorbent means; and

b. Two flaps extending laterally outwardly from said absorbent means;

wherein:

i. Each of said flaps is connectively associated with said absorbent means along a nonlinear line of juncture;

ii. Each of said flaps having a free distal edge remote from

iii. Each of said flaps including a first axis of flexibility intermediate said line of juncture and said distal edge; and

iv. Each of said flaps including a second axis of flexibility intermediate said first axis of flexibility and said distal edge; and

wherein said sanitary napkin is adapted to be worn adjacent the human body intermediate said body and the human wearer's undergarment.

4,687,479
BLOOD STORAGE DEVICE

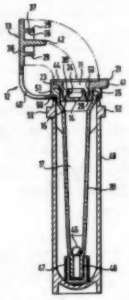
Walter Sarstedt, Nümbrecht-Rommelsdorf, and Dieter Korf, Nümbrecht-Winterborn, both of Fed. Rep. of Germany, assignors to Walter Sarstedt Kunststoff-Spritzgusswerk, Fed. Rep. of Germany

Filed Nov. 15, 1985, Ser. No. 798,761

Claims priority, application Fed. Rep. of Germany, Nov. 20, 1985, 3442423

Int. Cl.[4] A61B *19/00*

U.S. Cl. 604—403 **14 Claims**



1. A blood storage device comprising:

a tubule having a capillary-like mouthpiece at a lower end for receiving blood and an opening of substantially larger diameter than that of said mouthpiece at an upper end, said opening being sealably closable by a removable cover;

a closure member having a cylindrical section sized to fit inside said tubule in a sealing and removable manner, a flange extending peripherally from the top of said cylindrical section of sufficient width to cover the rim of the said tubule, a base wall at the bottom of said cylindrical section with an opening of sufficiently small diameter to substantially prevent the passage of blood while permitting the passage of air;

a sliding element comprising a cylindrical projection sized to pass through said flange into the interior of said cylindrical section of said closure member, said sliding element having a range of travel between an upper limit and a lower limit, a flat plate covering the top of and extending radially beyond said cylindrical projection while terminating within the circumference of said flange, a bead extending outward from said cylindrical projection, a stop extending inward from said closure member to engage said bead when said sliding element is at said upper limit, and a sealing projection extending upward from said base wall into the interior of said cylindrical section and radially spaced therefrom, the outer wall of said sealing projection sealingly engaging said cylindrical projection when said bead is at said lower limit.

4,687,480
CONTROLLED RELEASE CAPSULE

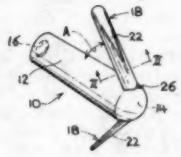
Ralph H. Laby, Canterbury, and Mark A. Lance, South Melbourne, both of Australia, assignors to Commonwealth Scientific and Industrial Research Organization, Campbell, Australia

Filed Sep. 9, 1985, Ser. No. 774,053

Claims priority, application Australia, Sep. 14, 1984, PG7116

Int. Cl.[4] A61K *9/22*

U.S. Cl. 604—891 **18 Claims**



1. A capsule for insertion into the rumen of an animal through the oesophagus and adapted to be retained therein while releasing a therapeutic or nutrient composition, said capsule comprising an elongate, tubular body member for housing a quantity of said composition, said tubular body having a leading and a trailing end; and a plurality of elongated wings, each wing being pivotally attached at one end thereof to the body member in the vicinity of the leading end of the latter; each wing being resiliently biased away from a storage position, to which it is pivotable so as to extend along the body member, toward the trailing end thereof, to a laterally extending operative position in which it is at a predetermined angle to the body member, and being constrained against pivoting beyond such angle; each of said wings

(a) being formed integrally with the body member,

(b) being of arcuate form transversely of its longitudinal extent to define a concave surface which, with the wing in its storage position, contacts the body member, and a convex surface remote from the concave surface; and

(c) merging with the body member along a curved, integral hinge connection which is of a curvature corresponding substantially to the curvature of the concave and convex surfaces;

such that it is biased to said operative position at said prede-

termined angle but constrained against pivoting beyond said angle.

4,687,481

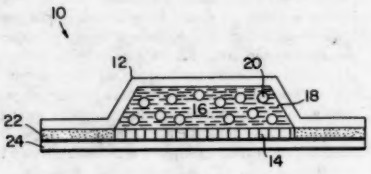
TRANSDERMAL DRUG DELIVERY SYSTEM

Elie S. Nuwayser, Wellesley, Mass., assignor to BIOTEK, Inc., Woburn, Mass.

Division of Ser. No. 653,362, Oct. 1, 1984, Pat. No. 4,624,665. This application Mar. 3, 1986, Ser. No. 835,154

Int. Cl.[4] A61M 7/00

U.S. Cl. 604—897 **18 Claims**



1. A transdermal drug delivery system, which system comprises:

(a) an impervious backing sheet;

(b) a macroporous, nondrug rate-controlling, liquid-base-retaining face member, which macroporous membrane has pores of sufficiently large size, to avoid rate control of the drug to be transdermally delivered, and of sufficiently small size, to provide a controlled amount of a thin film of a base material to the skin of the user;

(c) the backing sheet and the macroporous membrane secured together to form an intermediate reservoir therebetween; and

(d) the reservoir having a composition therein comprising:

(i) a dermatologically acceptable viscous liquid base material, which liquid base material is selected to exude in a controlled amount through the pores of the face membrane, to form a thin film on the skin of the user and to occlude the skin of the user and to force hydration of the stratum corneum layer with water from the lower layers of the epidermis of the user in use; and

(ii) a plurality of solid, drug-rate-controlling microparticles generally uniformly dispersed and suspended in the liquid base material in the reservoir in an amount to provide for the desired time period of delivery of the drug to be transdermally delivered, the microparticles having a particle size of less than about 1000 microns and containing an effective therapeutic amount of a drug for transdermal delivery, the active drug material for transdermal delivery and the liquid base material being compatible to form a compatible transport relationship,

whereby, on application to the skin of a user of the transdermal drug delivery system, the liquid base material exuded from the macroporous membrane forms a stable thin film on intimate contact with the skin of the user, while the drug is released at a controlled release rate from the suspended microparticles into the liquid base material and directly into the skin of the user.

4,687,482

VASCULAR PROSTHESIS

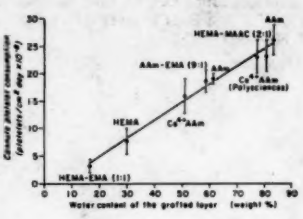
Stephen R. Hanson, Encinitas, Calif., assignor to Scripps Clinic and Research Foundation, La Jolla, Calif.

Filed Apr. 27, 1984, Ser. No. 604,996

Int. Cl.[4] A61F 1/24

U.S. Cl. 623—1 **32 Claims**

1. A vascular prosthesis for implantation in a living mamalian body comprising (a) an elongated tubular segment, said tubular segment having a substantially foraminous, non-complaint, hollow body portion open at both ends, said hollow body portion having a luminal surface defining a confined-flow passageway, and (b) a hydrophobic, physiologically compatible lining constituted by a polymeric material on said luminal



surface and defining a thormbus-resistant flow surface that prevents platelet deposition and is free from surface irregularities greater than about 5 microns in height, depth or width, said polymeric material exhibiting a rate of platelet consumption of less than about 20×10^8 platelets/cm^2. day.

4,687,483

HEART VALVE PROSTHESIS

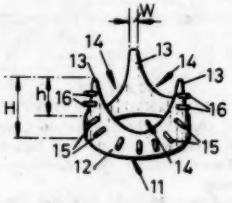
John Fisher, and David J. Wheatley, both of Glasgow, Scotland, assignors to University Court of the University of Glasgow, Glasgow, Scotland

Filed Sep. 11, 1985, Ser. No. 774,823

Claims priority, application United Kingdom, Sep. 28, 1984, 8424582

Int. Cl.[4] A61F 2/24

U.S. Cl. 623—2 **14 Claims**



1. A heart valve prosthesis comprising an annular support frame for a plurality of flexible tissue valve elements, said support frame having a plurality of spaced posts defining openings therebetween to permit a portion of each valve element to flex from an open position to a closed position, and means for securing the valve elements to the support frame comprising an outer annular sleeve concentric with said support frame adapted to clamp a non-flexing portion of each valve element in operative position between the support frame and said sleeve characterized in that said support frame and said sleeve are releasably secured to each other by means of a plurality in interengaging projections extending from one of the frame and sleeve member and releasably and connected to the other menber and on which the valve elements are mounted.

4,687,484

ANTERIOR CHAMBER INTRAOCULAR LENS

Linda J. Kaplan, 2500 E. Hallandale Beach Blvd., Suite 207, Hallandale, Fla. 33009

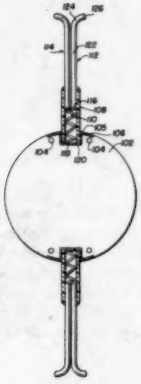
Continuation-in-part of Ser. No. 560,132, Dec. 12, 1983, abandoned. This application Jul. 1, 1986, Ser. No. 881,210

Int. Cl.[4] A61F 2/16

U.S. Cl. 623—6 **15 Claims**

1. An intraocular lens adapted for insertion into and fixation

in the anterior chamber of substantially any size of human eye, said lens comprising a lens optic portion and fixation means for fixing the lens optic portion in any size of eye, said fixation means comprising haptic means for accommodating the lens optic portion in the eye and spring means for facilitating fixation, said spring means extending outwardly from the lens optic portion, said intraocular lens being insertable in the eye through an incision of substantially the same diameter as the



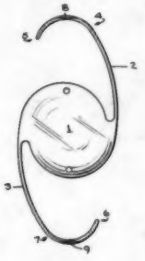
smallest diameter of the lens optic portion, wherein the haptic means comprises a pair of haptics each having a straight portion in contact with the spring means, said straight portions extending outwardly from the lens in closely spaced parallel position, and a curved end portion for fixing the haptic means in the eye connected to each straight portion, the curved end portions facing away from each other, and wherein the spring means are increasingly compressed as the haptic means are increasingly flexed.

4,687,485

INTRAOCULAR LENS WITH LEG MEANS HAVING COMPRESSIBLE REGIONS AND/OR COLOR

Drahoslav Lim, San Diego, Calif.; Stephen Jacoby, Belleair, Fla.; Richard Homick, San Diego, Calif., and Frank Powers, Clearwater, Fla., assignors to Barnes-Hind, Inc., Sunnyvale, Calif.

Filed Aug. 23, 1985, Ser. No. 768,902
Int. Cl.[4] A61F *2/16*
U.S. Cl. 623—6 **14 Claims**



1. An intraocular lens adapted for implantation in the anterior chamber of the eye, comprising

(a) a lens body; and

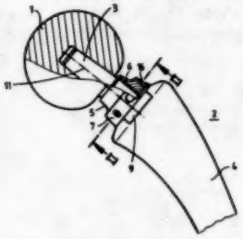
(b) leg means, attached to said lens body and comprising a plurality of filamentary legs each having a first end attached to said lens body and a free end, for centering said lens body in said chamber by tangential contact between tissure of the eye and a region on the outer periphery of each leg, wherein each of said regions is composed of a compressible physiologically inert material and the remainder of said leg means and said lens body are composed of a non-compressible physiologically inert material.

4,687,486

IMPLANT, PARTICULARLY ENDOPROSTHESIS

Paul Brinckmann, Münster, and Emmanuel Anapliotis, Berlin, both of Fed. Rep. of Germany, assignors to MECRON medizinische Produkte GmbH, Berlin, Fed. Rep. of Germany

Filed Mar. 5, 1984, Ser. No. 586,555
Claims priority, application Fed. Rep. of Germany, Mar. 4, 1983, 3308229; May 30, 1983, 3319916
Int. Cl.[4] A61F *2/30*
U.S. Cl. 623—16 **18 Claims**



1. A bone implant comprising: a first part having a receptacle; a second part having a pin projecting therefrom, said pin having a free end extending away from said second part, said pin having a threaded portion and a conical portion, said conical portion being located between said threaded portion and said free end of said pin and tapering toward said free end of said pin, said conical portion being sized to form a plug-in connection with the receptacle of said first part thereby operatively connecting said first and second parts together; and a nut threadedly engaging said threaded portion, whereby rotation of said nut toward said first part forces said first part away from said second part until said first part is pushed loose from said pin, thereby effectively separating said first part from said second part.

4,687,487

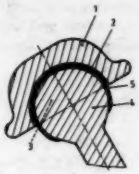
JOINT IMPLANT

Hans-Erich Hintermann, Ins, Switzerland, assignor to Association Suisse pour la Recherches Horlogere, Switzerland

Continuation-in-part of Ser. No. 419,185, Sep. 17, 1982, Pat. No. 4,522,453, which is a continuation of Ser. No. 180,578, Aug. 25, 1980, abandoned, which is a continuation of Ser. No. 24,421, Mar. 27, 1979, abandoned. This application Apr. 11, 1985, Ser. No. 722,017
Claims priority, application Switzerland, Jul. 21, 1978, 7872/78
The portion of the term of this patent subsequent to Jun. 11, 2002, has been disclaimed.
Int. Cl.[4] A61F *2/30*
U.S. Cl. 623—18 **16 Claims**

1. A tribological system comprising a first and second member, which together comprise a joint implant, each said member having a surface, said surface of said first member slidingly engaging said surface of said second member, a hard material coating on each of said surfaces, said hard material coating on

said first member being titanium carbonitride, and said hard material coating on said second member being selected from



the group consisting of titanium carbide, titanium nitride and titanium carbonitride.

4,687,488

FEMUR HEAD PROSTHESIS

Otto Frey, Winterthur, Switzerland, assignor to Silver Brothers Limited, Winterthur, Switzerland

Filed Sep. 11, 1984, Ser. No. 649,492

Claims priority, application Switzerland, Nov. 15, 1983, 6127/83

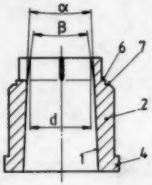
Int. Cl.[4] A61F 2/36

U.S. Cl. 623—22 **11 Claims**

1. A femur head prosthesis for mounting on a pin of an anchoring shank comprising

a shell-shaped joint head, and

a sleeve secured to and disposed within said joint head, said sleeve having a first tapered internal conical surface extending from an open end towards a closed second end within said joint head, a second tapered internal conical surface extending from said first surface to said closed end, said second surface having a cone angle greater than



the cone angle of said first surface and a plurality of radial slots formed in said second surface distributed circumferentially of said sleeve, whereby when said femur head prosthesis is mounted in place, said sleeve is matingly received on the pin and said second tapered conical surface plastically deforms relative to the pin thereby non-rotatably securing said femur head prosthesis to anchoring shank.

4,687,489

STABILIZER FOR BIOLOGICAL STAINING SOLUTIONS

Erwin Rieke, Seeheim, and Renate Kaschek, Reinheim, both of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Fed. Rep. of Germany

Filed Sep. 22, 1986, Ser. No. 909,643

Claims priority, application Fed. Rep. of Germany, Sep. 20, 1985, 3533515

Int. Cl.[4] G01N *1/30;* C09B *67/18;* C12M *1/34*

U.S. Cl. 8—506 20 Claims

1. In a staining solution for biological materials containing at least one thiazine dyestuff and at least one stabilizer, the improvement wherein the stabilizer is dimethylammonium sulfate.

4,687,490

PROCESS FOR CONTROLLING THE VISCOSITY AND STABILITY OF A COAL-WATER FUEL SLURRY

Harley L. Heaton, III; Joseph H. Lippold, Jr.; Edward T. McHale, and Edward G. Skolnik, all of Alexandria, Va., assignors to Atlantic Research Corporation, Alexandria, Va.

Filed Mar. 10, 1986, Ser. No. 838,122

Int. Cl.[4] C10L *1/32*

U.S. Cl. 44—51 12 Claims

1. Process for producing a stable coal-water fuel slurry which comprises the steps of:

I. determining the soluble ion content of a coal;

II. treating the coal to control the soluble ion content by removing soluble ions from the coal or adding an inorganic polyelectrolyte to the coal; and

III. admixing the coal with a dispersant, a base and water to produce a coal-water fuel slurry comprising approximately 60–75% by weight coal and having a total hardness of 100 ppmc to 1000 ppmc expressed as Ca^{2+} ion concentration.

4,687,491

FUEL ADMIXTURE FOR A CATALYTIC COMBUSTOR

James A. Latty, San Juan Capistrano, Calif., assignor to Dresser Industries, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 530,155, Sep. 7, 1983, which is a continuation of Ser. No. 294,871, Aug. 21, 1981. This application Feb. 23, 1984, Ser. No. 583,078

Int. Cl.[4] C10L *1/32*

U.S. Cl. 44—51 17 Claims

1. An admixture for burning in the presence of a catalyst having upper and lower stability limit temperatures substantially defining an operating temperature range for the catalyst, said admixture upon introduction to the catalyst comprising,

oxidant and fuel components present in substantially stoichiometric quantites relative to each other, and

a substantially non-conbustible major diluent component comprised of at least one of a substance selected from the group consisting of H_2O, CO_2, N_2 and SO_2, said diluent component having a mass ratio relative to said fuel component generally within the range of 5.7:1 to 26.2:1,

said components having a thermodynamic temperature equilibrium not substantially less than said lower stability temperature so that said burn-mixture combusts in the presence of the catalyst with an adiabatic combustion temperature within said operating temperature range so as to directly heat said diluent and minor fluid components and thereby to produce a heated working fluid,

wherein the adiabatic combustion temperature is the highest possible combustion temperature obtained under conditions that burning occurs in an adiabatic vessel, that burning is complete, and that dissociation does not occur.

4,687,492

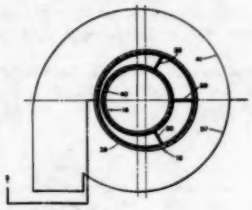
CYCLONE FOR LESSENING FORMATION OF CARBONACEOUS DEPOSITS

Paul W. Walters, Ashland, and A. V. Peppard, Catlettsburg, both of Ky., assignors to Ashland Oil, Inc., Ashland, Ky.

Continuation of Ser. No. 600,914, Apr. 16, 1984, abandoned. This application Jul. 15, 1986, Ser. No. 886,760

Int. Cl.[4] B01D *45/12;* B04C *5/107*

U.S. Cl. 55—1 8 Claims



1. An improved cyclone for lessening significantly the tendency of hydrocarbon conversion products from high Conradson Carbon feedstocks from depositing carbonaceous deposits on surfaces there within, said improved cyclone comprises:

at least one separate zone having a top, a bottom, a circumferential wall and a longitudinal axis;

at least one tangential inlet with a vertical opening through at least a portion of said circumferential wall near said top for a vapor/particulates stream;

at least one particulate stream outlet conduit near said bottom for a particulate rich stream separable from said vapor/particulates stream; and

at least one vapor stream outlet conduit means projecting through at least a portion of said top and having an interior surface, an exterior surface, at least one end being open to the interior of said at least one separation zone and another end adapted to vent exterior to said separation zone a vapor rich stream separable from said vapor/particulates stream;

wherein said exterior surface is not centrosymmetric with respect to said longitudinal axis and is in cross-section as viewed along the longitudinal axis in a shape selected from the group consisting of a circle and an elipse; wherein distances between different portions of said exterior surface of said outlet conduit means and that portion of interior surfaces of said circumferential wall nearest thereto vary so as to reduce the tendency for carbonaceous deposits to form on said exterior surface of said outlet conduit means.

4,687,493

ELECTROSTATIC PARTICLE DISPERSION FOR FLUID MIXTURE SEPARATION AND CHEMICAL CONVERSION

Leland C. Dickey, 310 Sawmill La., Apt. 3J, Horsham, Pa. 19044

Filed Dec. 2, 1985, Ser. No. 803,631

Int. Cl.[4] B03C *3/00*

U.S. Cl. 55—2 6 Claims

1. A method for separating components of a fluid mixture which comprises:

(a) imparting an electrostatic charge to an array of fine particles,

(b) introducing the particles into a separation vessel having an inlet and outlet for passage of the fluid mixture therethrough,

(c) maintaining uniform dispersion of the particles within the vessel and maintaining the particles in place by charging the walls of the vessel with the same electrostatic charge as that on the particles,

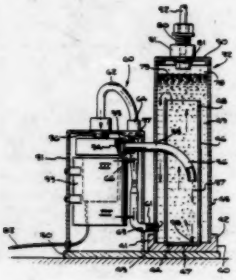
(d) causing the fluid mixture to flow into the vessel through the inlet,
(e) holding the fluid mixture in the vessel for a period of time such that at least one of the components of the mixture is absorbed by the particles, and
(f) causing the remainder of the fluid mixture to flow out of the vessel through the outlet.

4,687,494

APPARATUS AND METHOD FOR PUMPING AIR

Peter R. Escobal, 607 N. Inglewood Ave., Inglewood, Calif. 90302

Filed Aug. 18, 1983, Ser. No. 524,310
Int. Cl.[4] B01D *19/00, 47/02*
U.S. Cl. 55—37 **7 Claims**



1. In a method of providing virtually unpolluted air to a remote body of water for aeration thereof, the steps of:
providing a reservoir of water of selected fixed quantity and an air pressure chamber having a volume defined by the water level of the water reservoir;
providing an uninterrupted unbroken path for continuous circulation of said fixed quantity of water, said path including pumping inlet and outlet path portions and said reservoir;
introducing air into the pumping path portion to provide an air-water mixture;
pumping the air-water mixture into the reservoir below its water level to cause frothing of said air-water mixture and separation of the air therefrom to accumulate cleansed air under pressure in said pressure chamber;
and conducting said pressure air from said air chamber to said remote body of water for introduction therein at a selected point for aeration of said remote body of water.

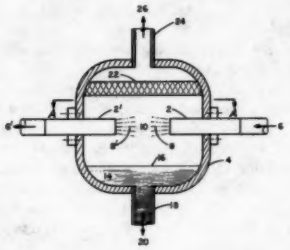
4. In an apparatus for treating and pumping air under pressure into a body of water in an aquarium tank provided with an air inlet below the water level, the combination of:
a water pump means having an inlet port and an outlet port;
an air-water separation and air cleansing means comprising:
an inner upright tube providing an inner chamber closed at the bottom and having a top open end,
an outer upright container for the inner tube and having a cross-sectional area greater than that of the tube and defining an annular chamber with the inner tube, extending above the inner tube, and having a top wall spaced from the open top end of the inner tube;
said top wall having an outlet fitting adapted to be connected with said air inlet of the aquarium tank;
pipe means interconnecting the outlet port of the pump means with the inner chamber of the inner tube below the top of the inner tube, and the outer annular chamber with the inlet port of the water pump means;
said inner and outer chambers, said pipe means, and said pump means containing a fixed unchanging quantity of water, the level of water in the outer container covering the top open end of the inner tube and spaced from said top wall to provide an air accumulation chamber defined by said water level and said top wall;
an air inlet means in said pipe means to provide an airwater mixture;
whereby discharge of the air-water mixture into the inner chamber below the top of the inner tube and forcibly directed against the bottom of the inner tube causes a frothing of the mixture in the inner chamber which rises to the water level and releases water cleansed air into said air accumulation chamber and to provide air under pressure therein for communication to said air inlet at said aquarium tank;
said air inlet means including means to accelerate flow of water in the pipe means.

4,687,495

FLOW CONTROL SYSTEM FOR EROSIVE FLUIDS

James P. Maddox, Van Nuys, Calif., assignor to Imo Delaval Inc., Lawrenceville, N.J.

Filed Oct. 6, 1986, Ser. No. 915,388
Int. Cl.[4] B01D *19/00*
U.S. Cl. 55—46 **8 Claims**



8. In a system for letting down a high-pressure erosive fluid stream containing gas, liquid, and solid particle fractions comprising
a source of said fluid stream;
a main line with one end connected to said source;
a manifold connected to the other end of the main line;
a throttle valve in the mainline between said source and said manifold;
a multiplicity of combinations, each consisting of a shutoff valve, a connector, twin flow branches and a pair of nozzle means, said combinations plumbed in parallel to said manifold, with the shutoff valve next to the manifold, and one of the nozzle means in each said pair of nozzle means aligned coaxially in opposition to the other nozzle means in the pair of nozzle means;
a receiver tank with side wall openings accepting said multiplicity of pairs of opposed nozzle means directed into said tank through said openings toward the center of said tank;
a slurry outlet in said tank for the outflow of said liquid and solid particle fractions of said fluid stream from said tank;
a gas outlet in said tank for the outflow of said gas fraction of said fluid stream from said tank, and
a mist eliminator in said tank located between said multiplicity of pairs of nozzle means and said gas outlet:
the method for fluid pressure letdown comprising the direction of said fluid stream through said multiple airs of nozzle means, the two nozzle means in each pair aligned coaxially opposed to each other and discharging said fluid through said sidewalls into said tank so that the kinetic energies of the opposing fluids are dissipated inside said tank with associated expansion to a lower pressure, and a gas-liquid separation, with gases flowing through said gas outlet and the liquid-solid slurry flowing through said slurry outlet.

4,687,496

PROCESS FOR CLEANING A PACKED COLUMN

Gunter Weber, Linden, Fed. Rep. of Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Filed Apr. 17, 1986, Ser. No. 853,076

Claims priority, application Fed. Rep. of Germany, Apr. 17, 1985, 3513809

Int. Cl.[4] B01D *53/14*

U.S. Cl. 55—73 20 Claims

1. In a process for operating a packed column containing particles of packing material utilized for gas cleaning in a scrubbing operation performed with a scrubbing medium, said process comprising; introducing gas to be scrubbed at a bottom portion of said column and introducing said scrubbing medium at a top portion of said column for counter-current scrubbing of said gas, and discontinuing scrubbing of said gas when said column has become at least partially plugged with deposits, wherein the improvement comprises flooding the plugged packed column by introducing a flooding fluid into the column to unplug the column thereby causing a portion, but not all, of said particles of packing material to move upwards, said flooding fluid having a specific gravity which is greater than the specific gravity of said packing material.

4,687,497

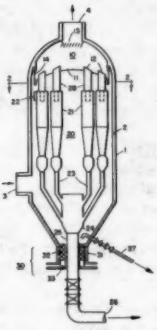
SOLIDS-GAS SEPARATOR

Hartley Owen, Belle Mead, and James H. Haddad, Princeton Junction, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Sep. 29, 1986, Ser. No. 912,287

Int. Cl.[4] B01D *45/12*

U.S. Cl. 55—349 12 Claims



1. A solids-gas separator for recovering fine solid particles entrained in a hot gas stream comprising:

an enclosed refractory lined vertical metal vessel having a lower gas stream inlet and a top clean gas outlet;

a plurality of thermally expandable metal cyclone assemblies contained within the vessel and supported at a top portion thereof by a horizontal support plate means for dividing the vessel into a lower hot gas receiving chamber and an upper clean gas plenum chamber;

each of said cyclone assemblies having a peripheral gas inlet into a cyclonic separation portion, an upper cyclone gas vertical outlet and an elongated vertical solids-conveying tube extending downwardly from the cyclone separation portion for removing solid particles therefrom, said cyclone assemblies expanding downwardly from the support plate during heating;

a central solids collector connected to receive separated solids from each of the cyclone assembly tubes;

a vertically slidable collector outlet conduit connected to the collector at a bottom portion thereof and extending downwardly through the enclosed vessel at a central point therein;

compressible seal means attached to the vessel by an annular packing holder member, a vertically movable packing compression member disposed around the collector outlet conduit in sliding relationship thereto, and a solid temperature resistant compressible packing material retained between the annular packing holder and the collector outlet conduit for effecting a vertically sliding seal.

4,687,498

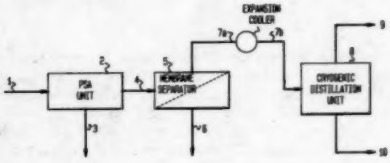
ARGON RECOVERY FROM HYDROGEN DEPLETED AMMONIA PLANT PURGE GAS UTILIZING A COMBINATION OF CRYOGENIC AND NON-CRYOGENIC SEPARATING MEANS

Donald L. Maclean, Annandale; Ramachandran Krishnamurthy, Cranbury, and Steven L. Lerner, Berkeley Heights, all of N.J., assignors to The Boc Group, Inc., Montvale, N.J.

Filed Feb. 24, 1986, Ser. No. 832,205

Int. Cl.[4] F25J *3/00*

U.S. Cl. 62—17 30 Claims



1. A process for recovery of argon from a gas stream comprising hydrogen, nitrogen, methane, and argon comprising the following steps:

(i) passing said gas stream through a pressure swing adsorption means to separate essentially all of the methane and most of the nitrogen, thereby producing a product stream comprising a predominant amount of argon; and

(ii) passing said product stream to a means for separating out most of the hydrogen to produce a hydrogen depleted product; and

(iii) passing said hydrogen depleted product stream to a cryogenic distillation means to produce an essentially pure argon final product by separating out the remaining hydrogen and nitrogen.

4,687,499

PROCESS FOR SEPARATING HYDROCARBON GAS CONSTITUENTS

Hafez K. Aghili, Katy, Tex., assignor to McDermott International Inc., New Orleans, La.

Filed Apr. 1, 1986, Ser. No. 847,071

Int. Cl.[4] F25J *3/02*

U.S. Cl. 62—24 14 Claims

1. A process for separating the constituents of a natural gas stream comprising:

(a) lowering the temperature of said gas stream;

(b) supplying said lower temperature gas stream to a high pressure separator, said high pressure separator separating said gas stream into predominantly vapor and predominantly fluid streams;

(c) lowering the pressure of said predominantly vapor stream;

(d) supplying said lower pressure vapor stream to an upper region of a demethanizer column;

(e) lowering the pressure of said predominantly fluid stream;

(f) supplying said lower pressure fluid stream to said demethanizer column at an elevation below said vapor stream;

(g) removing cold vapor residue gas from an upper region of said demethanizer column, said vapor residue gas com-

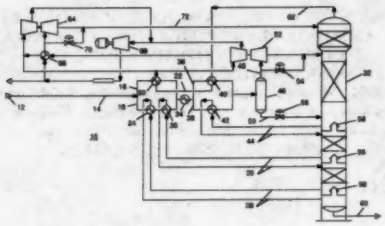
prising predominantly of methane and other residual light vapors;

(h) passing said vapor residue gas through at least one heat exchanger to raise the temperature of said vapor residue gas;

(i) compressing said vapor residue to a higher pressure;

(j) drawing off a portion of said higher pressure vapor residue;

(k) lowering the temperature of said drawn off higher pressure vapor residue.



(l) lowering the pressure of said higher pressure residue to produce a predominantly liquid stream;

(m) supplying said lower temperature predominantly liquid stream as reflux to the top of said demethanizer column whereby the addition of said reflux alters the chemical equilibrium existing in the top of said demethanizer column thereby enhancing the separation of the inlet stream constituents in said demethanizer column; and,

(n) removing a demethanized liquid product from a lower region of said demethanizer column.

4,687,500

METHOD FOR MANUFACTURING AN ION-SENSITIVE ELECTRODE

Mark A. Gelo, Concord, and Moshe J. Hirshberg, Brookline, both of Mass., assignors to Orion Research Inc., Cambridge, Mass.

Division of Ser. No. 647,599, Sep. 5, 1984. This application Feb. 13, 1986, Ser. No. 812,743

Int. Cl.[4] C03B *23/20*

U.S. Cl. 65—36 **7 Claims**

1. For manufacturing an ion-sensitive-electrode body having a portion formed of an ion-selective membrane material, a method comprising the steps of:

A. inserting an end of a tube, which tube consists essentially of material that absorbs radiation of a predetermined wavelength, into a bulb consisting essentially of an ion-selective membrane material that is substantially transparent to radiation of the predetermined wavelength so that the end of said tube contacts an inner surface of said bulb; and

B. shining radiation of the predetermined wavelength through said bulb onto the end of said tube in contact with said bulb to fuse said end of said tube to the inner surface of said bulb.

4,687,501

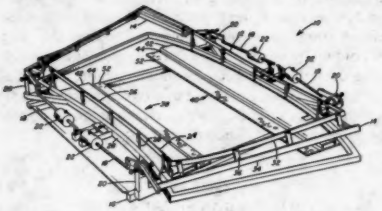
LIGHTWEIGHT BENDING IRON HEAT SHIELDS FOR GLASS BENDING MOLDS

Thomas J. Reese, Sarver, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Apr. 21, 1986, Ser. No. 854,240

Int. Cl.[4] C03B *23/025*

U.S. Cl. 65—103 **20 Claims**



1. A bending mold for shaping heat softened glass sheets comprising:

a support frame;

a glass sheet shaping rail supported on said frame with a supporting surface that conforms in elevation and outline to the desired shape of said glass sheet to be shaped slightly inboard of said glass sheet perimeter; and

a heat shielding means positioned between said heating means and selected portions of said glass sheet to retard transfer of heat from said heating means to said selected portions of said glass sheet, said heat shielding means including;

a first member positioned in facing relationship between said selected portions of said glass sheet to be shaped and said heating means; and

a shield member positioned between said first member and said heating means and spaced from said first member to provide a gaseous space therebetween to retard transfer of heat between said heating means and said first member.

17. In the method of shaping glass sheets by sag bending, including the steps of positioning a glass sheet to be shaped on a support frame having a shaping rail with a support surface that conforms in elevation and outline to the desired shape of a sheet to be shaped slightly inboard of the sheet perimeter, heating said glass sheet to its deformation temperature so that said glass sheet sags in contact with said shaping rail, retarding the transfer of heat from a heat source to selected portions of said glass sheet by positioning plate members between said selected portions and said heat source so as to delay said selected portions from reaching its heat deformation temperature, wherein said plate members absorb heat from said heat source and re-radiant said heat so as to lessen the effectiveness of said plate members in limiting heat transfer between said heat source and said selected portions the improvement comprising:

providing shield members between selected ones of said plate members and said heat source with a gaseous space between said plate members and said shield members so as to retard transfer of heat between said plate members and shield members and maintain the effectiveness of said plate members in retarding heat transfer from said heat source to said selected portions of said glass sheet.

4,687,502

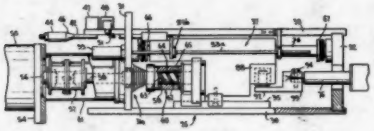
UNIVERSAL SERVO-DRIVEN GOB DISTRIBUTOR

Robert J. Douglas, North Granby; Robert L. Doughty, West Hartford; John P. Mungovan, Simsbury; Robert P. Andersen, Monroe, and Vaughan Abbott, North Granby, all of Conn., assignors to Emhart Industries, Inc., Farmington, Conn.

Continuation of Ser. No. 734,096, May 15, 1985, Pat. No. 4,599,101. This application Jul. 8, 1986, Ser. No. 882,995

Int. Cl.[4] C03B *7/08*

U.S. Cl. 65—164 2 Claims



1. A gob distributor comprising

a head including at least one gob scoop having a pinion and a rack for interconnecting with said pinion so that said gob scoop can be rotatively displaced through a predetermined angular range,

a ball screw assembly including

a ball screw

ball screw nut means

means for releasably connecting said ball screw nut means and said rack,

housing means for supporting said ball screw and said ball screw nut means,

said housing means being selectivley configured to contain said releasably connecting means and having an access area whereby said releasably connecting means can be manually released, and

means for releasably securing said head to said housing means whereby said head can be removed by releasing said head securing means and said connecting means.

4,687,503

APPARATUS FOR LOADING AND UNLOADING ARTICLES AT MACHINES FOR CUTTING OFF EXCESS ENDS OF HOLLOW GLASS, PLASTIC OR SIMILAR ARTICLES

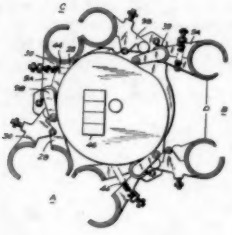
Jaime Valdes-Neri, Guadalupe; Abel Gomez-Sanchez, Monterrey, and Miguel H. Calderon-Quintero, San Nicolas de los Garza, all of Mexico, assignors to Vitrocrisa Cristaleria, S.A., Monterrey, Mexico

Filed Aug. 20, 1986, Ser. No. 898,383

Claims priority, application Mexico, Sep. 2, 1985, 206483

Int. Cl.[4] C03B *21/02*

U.S. Cl. 65—174 10 Claims



1. An apparatus for the loading and unloading of articles at machines for cutting off excess ends of hollow glass, plastic or similar articles which comprises a supporting structure which includes a vertical shaft; rotating transference means attached to axially coincide with the said vertical shaft in order to hold and transport the articles; cam means attached to the said vertical shaft, between which the mentioned transference means are attached, in order to determine by means of the profile of the cams, the path that must be imparted to said transference means; and driving means attached to the transference means in order to make them rotate in predetermined time relationships at the reception, feeding and delivery of article positions.

4,687,504

GLASS MELTING FURNACE WITH BOTTOM ELECTRODES

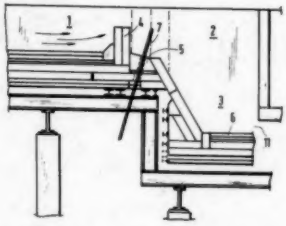
Helmut Pieper; Adolf Knauer, both of Lohr, and Helmut Sorg, Glattbach, all of Fed. Rep. of Germany, assignors to Sorg GmbH & Co. KG, Lohr, Fed. Rep. of Germany

Filed Oct. 1, 1985, Ser. No. 782,404

Claims priority, application Fed. Rep. of Germany, Oct. 6, 1984, 3436793

Int. Cl.[4] C03B *5/027*

U.S. Cl. 65—326 16 Claims



1. A glass melting furnace including a melting tank heated from above by burners comprising a melting section having a bottom; a refining and homogenizing section provided with electrodes for the supply of electrical energy wherein said electrodes are arranged in one or more planes (levels) of the refining section, said refining and homogenizing section having a bottom with an outlet therefrom, the bottom being positioned below that of the melting section; a dam which separates the melting section from the refining and homogenizing section, said dam having an upper edge which is disposed to enable a glass melt bath to flow thereover; and a bottom portion provided adjacent to the dam and which is disposed at a level substantially above the bottom of the homogenizing section.

4,687,505

METHOD FOR DESALINATION AND REHABILITATION OF IRRIGATED SOIL

Truman V. Sylling, 371 E. Ross Rd., El Centro, Calif. 92243, and Stephen L. Allen, 3327 Fairlomas Rd., National City, Calif. 92050

Continuation-in-part of Ser. No. 547,866, Nov. 2, 1983, abandoned. This application May 9, 1985, Ser. No. 732,501

Int. Cl.[4] C05G *3/04;* C09K *17/00*

U.S. Cl. 71—27 4 Claims

1. A process for reducing harmful effects of alkaline deposits in irrigated soils comprising applying to the soil an aqueous solution of an anionic polymaleic anhydride compound having threshold properties, said anionic compound or neutral salt thereof being applied in a quantity of from about 0.1 pound to about 25 pounds per acre of land applied directly to the soil prior to irrigation or by incorporation into irrigation water applied to the soil over a period of from about 4 to about 96 hours.

4,687,506

AGRICULTURAL SULFONAMIDE

William R. O'Grady, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

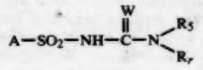
Continuation of Ser. No. 196,266, Oct. 22, 1980, abandoned, which is a continuation-in-part of Ser. No. 098,780, Nov. 30, 1979, abandoned. This application Nov. 14, 1983, Ser. No. 551,467

The portion of the term of this patent subsequent to Feb. 26, 1997, has been disclaimed.

Int. Cl.[4] A01B *43/54;* **C07D** *239/48, 401/12*

U.S. Cl. 71—92 **20 Claims**

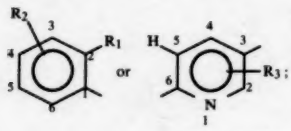
1. A compound selected from



[I]

and agriculturally suitable salts thereof, wherein:

A is



R_1 is

F, Cl, Br, CH_3, OCH_3, NO_2, CF_3, $SO_2NR_7R_8$, $S(O)_nR_8'$,

OSO_2R_{10} or

R_2 is H, Cl, CH_3, CF_3, NO_2 or OCH_3;

R_3 is F, Cl, Br, CH_3, OCH_3, or $S(O)_nR_{12}$;

R_4 is H or CH_3;

Q is O, S or

R_6 is C_1–C_4 alkyl, C_3–C_4 alkenyl, $CH_3OCH_2CH_2$;

when Q is O, then R_6 is also $ClCH_2CH_2$;

R_{13} is H, C_1–C_2 alkyl, OCH_3 or R_6 and R_{13} can be taken together to form $—CH_2CH_2CH_2CH_2—$ or $—CH_2CH_2O—CH_2CH_2—$; and when R_{13} is OCH_3, then R_6 is CH_3;

R_8' is C_1–C_3 alkyl;

R_9 is H or C_1–C_4 alkyl;

R_{10} is C_1–C_4 alkyl or CF_3;

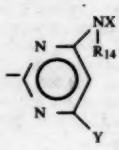
R_{12} is C_1–C_3 alkyl;

R_7, R_8 are independently C_1–C_4 alkyl provided that the total number of carbon atoms is less than or equal to five;

W is O or S;

n is 0, 1 or 2;

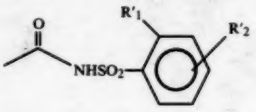
R_5 is



R_{14} is H or CH_3;

Y is F, Cl, Br;

X is H, or



R_1' is

F, Cl, Br, CH_3, OCH_3, NO_2, CF_3, $SO_2NR_7R_8$, $S(O)_nR_8'$,

OSO_2R_{10}, or

and

R_2' is H, Cl, CH_3, CF_3, NO_2 or OCH_3.

4,687,507

AGRICULTURAL SULFONAMIDES

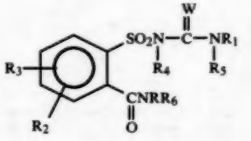
George Levitt, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 480,591, Mar. 30, 1983, Pat. No. 4,545,808, which is a division of Ser. No. 98,781, Nov. 30, 1979, Pat. No. 4,394,506, which is a continuation-in-part of Ser. No. 29,281, Apr. 13, 1979, abandoned, which is a continuation-in-part of Ser. No. 15,341, Mar. 1, 1979, abandoned, which is a continuation-in-part of Ser. No. 965,070, Nov. 30, 1978, abandoned, which is a continuation-in-part of Ser. No. 910,965, May 30, 1978, abandoned. This application Aug. 9, 1985, Ser. No. 764,199

Int. Cl.[4] A01N *43/54;* **C07D** *251/16, 251/18, 251/46*

U.S. Cl. 71—92 **17 Claims**

1. A compound selected from



wherein

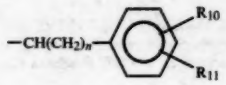
R is hydrogen; C_1–C_{12} alkyl; $(CH_2CH_2O)_{n'''}R_{12}$;

$CH_2CH_2CH_2OR_{12}$; C_3–C_{10} alkenyl; C_3–C_6 alkynyl; C_3–C_8 cycloalkyl; C_5–C_6 cycloalkenyl;

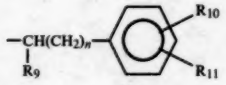
R is also C_5–C_8 cycloalkyl substituted with 1 to 3 substituents selected from (a) 0–2 OCH_3 groups, (b) 0–3 CH_3 groups or (c) C_2H_5;

R is also trifluoromethylcyclohexyl; C_4–C_{10} cycloalkylalkyl; C_4–C_8 cycloalkyl substituted with 1–2 CH_3 groups; CH_2CN; CH_2CH_2CN; $C(CH_3)_2CN$; OCH_3; $N(CH_3)_2$;

R is also



with



wherein

n''' is 1, 2 or 3;

R_{12} is CH_3, CH_2CH_3, $CH(CH_3)_2$ or phenyl;

n is 0, 1, 2 or 3;

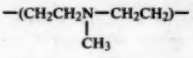
R_9 is H or C_1–C_3 alkyl;

R_{10} is H, C_1–C_3 alkyl, Cl, Br, OCH_3 or OC_2H_5;

R_{11} is H, C_1–C_3 alkyl, Cl, Br, OCH_3 or OC_2H_5;

R' is H, C_1–C_4 alkyl, OCH_3, F, Br, Cl, CF_3, CN, NO_2, SO_2CH_3, SCH_3 or $N(CH_3)_2$; R'' is H, C_1–C_4 alkyl, OCH_3, F, Br or Cl; R''' is H, CH_3, Cl, F or Br;

R_6 is H; C_1–C_6 alkyl; allyl; CH_2CN; or CH_2CH_2CN; or R and R_6 may be taken together to form $—(CH_2)_4—$, $—(CH_2)_5—$, $—(CH_2)_6—$, $—(CH_2CH_2OCH_2CH_2)—$ or



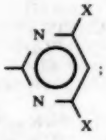
provided that

(a) when R is OCH_3, then R_6 is CH_3;

(b) when R_6 is CH_2CH_2CN or CH_2CN, then R is CH_2CH_2CN or CH_2CN; and

(c) R and R_6 have a total number of carbon atoms less than or equal to 13;

R_1 is



R_2 is H, Cl, Br, F. C_1–C_3 alkyl, NO_2, SO_2CH_3, OCH_3, SCH_3, CF_3, $N(CH_3)_2$, NH_2 or CN;

R_3 is H, Cl, Br, F or CH_3;

R_4 is H or CH_3;

R_5 is H, CH_3 or OCH_3;

W is O or S;

X is H, Cl, CH_3, OCH_3, OCH_2CH_3 or $OCH_2CH_2OCH_3$;

Y is H; F; Cl; Br; C_1–C_4 alkyl; C(O)L; C_1–C_4 alkyl substituted with (a) OCH_3, (b) OC_2H_5, (c) CN, (d) C(O)L or (e) 1–3 atoms of F, Cl or Br;

Y is also C_3–C_4 alkenyl; $CH_2CH{=}CR_{13}$; $A(CH_2)_{n'}A_1$-(C_1–C_3 alkyl); $ACH_2C(O)L$; $ACH(CH_3)C(O)L$; $ACH_2CH_2C(O)L$; SCN; N_3; $NR_{16}R_{17}$; OR_{14} or SR_{15};

R_{13} is H, CH_3 or CH_2Cl; n' is 2 or 3; A is O or S; A_1 is O, S or SO_2;

L is NH_2, OH, $N(OCH_3)CH_3$, , $NH(C_1$–C_4 alkyl), $N(C_1$–C_4 alkyl)$_2$, or C_1–C_6 alkoxy;

R_{16} is H or CH_3;

R_{17} is H, OCH_3, C_1–C_6 alkyl, C_1–C_4 alkyl substituted with (a) CN or (b) C(O)L;

R_{17} is also C_3–C_4 alkenyl, C_3–C_6 cycloalkyl or C_2–C_3 alkyl substituted with (a) OCH_3 or (b) OC_2H_5;

R_{16} and R_{17} may be taken together to form $—CH_2CH_2CH_2CH_2—$ or $—CH_2CH_2OCH_2CH_2—$;

R_{14} is C_1–C_4 alkyl; C_2–C_4 alkyl substituted with 1–3 atoms of F, Cl or Br; C_1–C_4 alkyl substituted with CN; C_3–C_4 alkenyl; $CH_2C{=}CR_{13}$; or

and

R_{15} is C_1–C_4 alkyl, allyl, propargyl or C_1–C_2 alkyl substituted with CN;

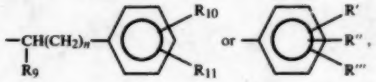
provided that

(a) when Y is greater than or equal to 4 carbon atoms, then R is less than or equal to 4 carbon atoms;

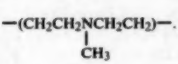
(b) when X is Cl, then Y is Cl; and when X and Y are both H, then R is less than or equal to 4 carbon atoms;

(c) when R_5 is H or CH_3 and Y is H, C_3–C_4 alkenyl, $CH_2C{=}CR_{13}$, F, Cl, Br, C_1–C_4 alkyl or OR_{14}, wherein R_{14} is C_1–C_4 alkenyl, $CH_2C{=}CR_{13}$, or

then R must be other than H, C_1–C_{12} alkyl, C_3–C_{10} alkenyl, C_3–C_6 alkynyl, C_3–C_8 cycloalkyl, C_5–C_6 cycloalkenyl, C_5–C_8 cycloalkyl substituted with 1 to 3 substituents selected form (a) 0–3 CH_3 groups or (b) C_2H_5, C_4–C_{10} cycloalkylalkyl, C_4–C_8 cycloalkyl substituted with 1–2 CH_3 groups,



wherein R_{10} is H or C_1–C_3 alkyl, R_{11} is H or C_1–C_3 alkyl, R' is H or C_1–C_4 alkyl, R'' is H or C_1–C_4 alkyl, and R''' is H or CH_3; and R and R_6 may not be taken together to form $—(CH_2)_4—$, $—(CH_2)_5—$, $—(CH_2)_6—$, $—(CH_2CH_2OCH_2CH_2)—$ or



8. A composition suitable for controlling the growth of undesired vegetation which comprises an effective amount of a compound of claim **1** and at least one of the following: surfactant, solid or liquid diluent.

4,687,508

HERBICIDAL BENZENESULFONAMIDES

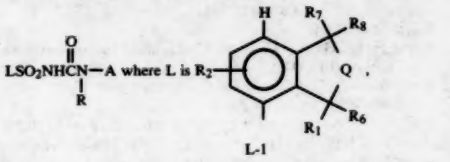
James V. Hay, Newark, and Richard F. Sauers, Hockessin, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 730,156, May 3, 1985, which is a division of Ser. No. 533,773, Sep. 19, 1983, Pat. No. 4,521,241. This application Dec. 30, 1985, Ser. No. 814,407

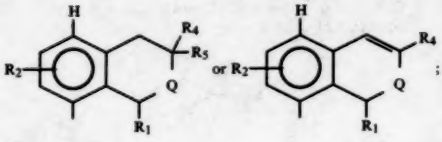
Int. Cl.[4] **A01N** *43/54*; **C07D** *401/12, 407/12, 409/12*

U.S. Cl. 71—92 **3 Claims**

1. A compound having the formula

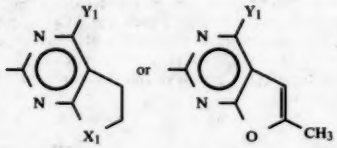


L-1



L-2 L-3

Q is O, $S(O)_n$ or NR_3;
n is 0, 1 or 2;
R_1 is H, CH_3, Cl or F;
R_2 is H, Cl, Br, C_1–C_3 alkoxy or CF_3;
R_3 is H or C_1–C_4 alkyl;
R_4 is H or CH_3;
R_5 is H or CH_3;
R_6 is H, Cl or F;
R_7 is H, Cl or F;
R_8 is H, Cl or F;
R is H or CH_3;
A is



A-2 A-4

X_1 is O;
Y_1 is H, CH_3, OCH_3 or Cl;
provided that
when R_1 is F or Cl, then R_6, R_7 and R_8 are the same as R_1 and Q is O or S; and when R_1 is H or CH_3, then R_6, R_7 and R_8 are H;
and their agriculturally suitable salts.

2. A composition suitable for controlling the growth of undesired vegetation which comprises an effective amount of a compound of claim 1 and at least one of the following: surfactant, solid or liquid diluent.

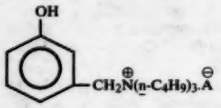
4,687,509

N,N,N-TRIBUTYL-(3-HYDROXYBENZYL)AMMONIUM SALTS AND A METHOD FOR INCREASING YIELD OF SOYBEANS

John C. Van Herrtum, Concord, and Theodore W. Holmsen, Clayton, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 19, 1986, Ser. No. 864,678
Int. Cl.[4] A01N *33/12*
U.S. Cl. 71—121 **4 Claims**

1. A composition useful for treating soybean plants to increase the yield of soybeans which contains an inert carrier in admixture with an active compound corresponding to the formula



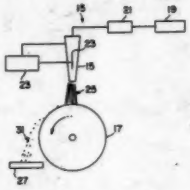
wherein A represents a non-phytotoxic anion.

4,687,510

METHOD FOR MAKING ULTRAFINE METAL POWDER

Richard F. Cheney, Sayre, and Richard H. Pierce, Towanda, both of Pa., assignors to GTE Products Corporation, Stamford, Conn.

Continuation of Ser. No. 581,522, Feb. 21, 1984, Pat. No. 4,592,781. This application Feb. 10, 1986, Ser. No. 827,566
Int. Cl.[4] C22C *1/04*
U.S. Cl. 75—0.5 B **1 Claim**



1. A process for producing a densified aluminum powder comprising forming a flowable agglomerated powder consisting essentially of aluminum and less than 10 atomic weight percent of hardness enhancing additives, entraining said agglomerated powder to a powder in a high pressure gas for transporting said powder to a plasma torch, creating a plasma in said gas and heating entrained powder to a molten condition to form a high velocity stream of molten metal droplets comprising aluminum and an additional discrete phase forming component, said stream being discharged from said torch at a speed greater than 200 meters per second directing said stream toward a repellant surface, fragmenting said molten droplets upon impact with said surface to form molten fragmented portions, rebounding said molten fragmented portions from said surface and cooling said fragmented portions to form a powder comprising particles less than about ten micrometers with smooth surfaces.

4,687,511

METAL MATRIX COMPOSITE POWDERS AND PROCESS FOR PRODUCING SAME

Muktesh Paliwal, Sayre, and Walter A. Johnson, Towanda, both of Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed May 15, 1986, Ser. No. 863,653
Int. Cl.[4] B22F *1/00*
U.S. Cl. 75—0.5 B **4 Claims**

1. A process for producing a composite powdered material consisting essentially of particles having a metal matrix phase selected from the group consisting of metals and metal alloys, and one or more relatively uniform discrete dispersed reinforcement phases in said matrix, said reinforcement phase or phases being of high strength or high hardness compounds selected from intermetallic compounds and metal compounds selected from the group consisting of metal borides, carbides, nitrides, oxides, carbonitrides, and mixtures thereof, said composite powdered particles being spheres of from about 25 to about 200 micrometers and wherein said reinforcement phase or phases have particles of a maximum size of less than about 10 micrometers, said process comprising:

(a) entraining in a carrier gas a plurality of powders wherein

at least one of said powders supplies a metal or metal alloy from which the matrix is to be formed, and wherein at least two of said powders supply the reactant constituents from which at least one of said reinforcement phases is to be formed;

(b) feeding said powders through a high temperature zone to cause essentially complete melting and coalescence of said powders and to cause at least part of said reactant constituents to combine to form at least one of said reinforcement phases; and

(c) resolidifying the resulting high temperature treated powder particles to form said composite powdered material.

4,687,512

DESULFURIZING MIXTURE FOR METAL MELTS, PROCESS FOR MAKING IT, AND PROCESS FOR DESULFURIZING LIQUID METAL THEREWITH

Hermann Schrödter, Erftstadt; Albert Braun, Hürth, and Friedrich-Wilhelm Kampmann, Erftstadt, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Sep. 19, 1986, Ser. No. 909,766

Claims priority, application Fed. Rep. of Germany, Oct. 3, 1985, 3535280

Int. Cl.⁴ C21C *7/02*

U.S. Cl. 75—58 **6 Claims**

1. Process for making a desulfurization mixture containing calcium carbide, calcium oxide, calcium fluoride, alkaline earth metal carbonate, aluminum oxide, and chemically unbonded carbon, the mixture containing 0.3–4.5 weight-% calcium fluoride and consisting essentially of ground particles having a size of less than 0.5 mm, said process comprising:

jointly grinding the constituents of said desulfurization mixture in a mill over a period of 3 to 30 minutes under dry inert gas.

4,687,513

CONDENSATION OF ZINC VAPOR

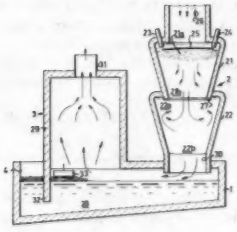
Sven Santén, and Börje Johansson, both of Hofors, Sweden, assignors to SKF Steel Engineering AB, Hofors, Sweden

Filed Jun. 9, 1986, Ser. No. 871,740

Claims priority, application Sweden, Jun. 12, 1985, 85029288

Int. Cl.⁴ C22B *19/04*

U.S. Cl. 75—88 **7 Claims**



1. A method of condensing zinc vapour out of a gas by bringing the gas into contact with a cooling metal, comprising the steps of generating an essentially coherent film of cooling metal covering substantially the entire cross section through which the gas containing zinc vapour is caused to pass, passing the gas through said film to form a mixture of gas and cooling metal, expanding the resultant mixture in at least one step to effect thorough mixing and thereafter accelerating the mixture and directing the mixture onto the surface of a cooling metal bath to separate any metal particles or drops present in the gas.

4,687,514

PROCESS FOR THE RECOVERY OF NOBLE METALS FROM SOLUTIONS

Hermann Renner, Worms; Karlheinz Kleiss, Linsengericht, and Rainer Schlodder, Rodenbach, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Del.X

Filed Jun. 9, 1983, Ser. No. 502,726

Claims priority, application Fed. Rep. of Germany, Jun. 24, 1982, 3223501

Int. Cl.⁴ C22B *11/04*

U.S. Cl. 75—109 **7 Claims**

1. A process for the recovery of rhodium from a dilute organic solution thereof comprising precipitating the rhodium by adding elemental tellurium to the solution at a temperature of 120° to 200° C.

4,687,515

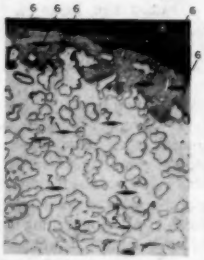
VACUUM INTERRUPTER CONTACT

Joseph L. Talento, Media, Pa., assignor to General Electric Company, New York, N.Y.

Filed Apr. 10, 1986, Ser. No. 849,995

Int. Cl.⁴ B22F *1/00*

U.S. Cl. 75—246 **5 Claims**



1. A vacuum interrupter contact of material comprising:

(a) copper in the range of 60–80 wt % of the material;

(b) ferrovanadium alloy comprising 40–100 wt % of the balance of said material;

(c) at least 80% of any remainder of said balance consisting of a refractory metal of the group of chromium, vanadium and their compounds;

(d) said ferrovanadium alloy comprising 55–85 wt % of vanadium;

(e) said material being made by grinding said ferrovanadium alloy, admixing powders of said ferrovanadium alloy and of the other constituents, and pressing and sintering said powders to provide a material having a density of at least 90% of theoretical density.

4,687,516

LIQUID FLUID LOSS CONTROL ADDITIVE FOR OIL FIELD CEMENTS

John F. Burkhalter, and Willis A. Weigand, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Dec. 11, 1984, Ser. No. 680,428

Int. Cl.⁴ C04B *7/02, 24/00*

U.S. Cl. 106—90 **20 Claims**

1. A liquid fluid loss control additive for oil field cements consisting essentially of a major amount of a liquid hydrocarbon, the balance of said additive comprising one or more hydrophilic water soluble polymers present in said additive in an amount in the range of from about 1% to about 50% by weight of said additive, an organophilic clay suspending agent present in said additive in an amount in the range of from about 1% to about 5% by weight of said additive, an organic sulfonate dispersant selected from the group consisting of the salts of polyvinyl sulfonic acid and naphthalene sulfonic acid con-

densed with formaldehyde present in said additive in an amount in the range of from about 1% to about 25% by weight of said additive, a polyamide amine surfactant for oil wetting said polymer selected from the group consisting of the condensation products of fatty acids having in the range of from about 14 to about 22 carbon atoms and ethylene amine compounds present in said additive in an amount in the range of from about 0.1% to about 1.0% by weight of said additive, and a surfactant for stripping liquid hydrocarbon from said polymer when in contact with water selected from the group consisting of aliphatic alcohols having in the range of from about 6 to about 18 carbon atoms reacted within the range of from about 5 to about 10 moles of ethylene oxide per mole and octyl, nonyl and dodecyl phenol reacted with in the range of from about 4 to about 20 moles of ethylene oxide per mole present in said additive in an amount in the range of from about 1% to about 10% by weight of said additive.

4,687,517

CONCRETE COMPOSITION HAVING HEAT RESISTING PROPERTY AND DIMENSIONAL STABILITY

Minoru Sawaide, Narashino; Noboru Ishikawa, Tanashi, and Hideyo Shiokawa, Chiba, all of Japan, assignors to Shimizu Construction Co., Ltd., Tokyo, Japan

Filed Dec. 19, 1985, Ser. No. 810,866

Claims priority, application Japan, Dec. 25, 1984, 59-281800

Int. Cl.[4] C04B *24/36*

U.S. Cl. 106—96 **6 Claims**

1. A concrete composition having a heat resisting property and dimensional stability, comprising a cement selected from the group consisting of a self-hardening cement, a latent hydraulic cement and a thermosetting cement, a hydraulic material, an aggregate, a carbonaceous material selected from the group consisting of a powdered coke and a pitch coke, said carbonaceous material capable of forming mesophase spherical particles by heating and being added in a ratio range of from about 0.1:1 to about 1:1 by weight of carbonaceous material to cement, and potassium titanate whisker having a diameter of about 0.1 to 1.0 micrometer and a length of 0.1 to 0.2 mm which is added at ratio range of from about 0.05:1 to about 0.5:1 by weight of whisker to cement.

4,687,518

METHOD FOR MANUFACTURING PYROGEN-FREE COLLAGEN GELS USEFUL AS CONTACT LENSES

Teruo Miyata, Tokyo, Japan, and Albert L. Rubin, Englewood, N.J., assignors to Optical Corp., Stamford, Conn.

Filed Nov. 6, 1985, Ser. No. 795,633

Int. Cl.[4] C08L *89/00*; G02C *7/04*

U.S. Cl. 106—161 **8 Claims**

1. A method for manufacturing a pyrogen-free atelocollagen gel for use in soft contact lenses which comprises the following aseptic steps:

(1) removing the corium layer from animal skin under aseptic condition;

(2) washing said corium layer with a sterile pyrogen-free salt solution to remove soluble substances other than collagen;

(3) grinding and dissolving the collagen with an acidic proteolytic enzyme in a sterile and pyrogen-free condition;

(4) filtering the dissolved collagen solution through a membrane filter to obtain a clear filtrate;

(5) neutralizing the filtrate with a strong base to precipitate atelocollagen;

(6) washing the precipitated atelocollagen with an organic solvent to remove lipid;

(7) drying the atelocollagen precipitate;

(8) dissolving the dried atelocollagen in an aqueous solution to a concentration of from 1% to 10% to make a gel for contact lens manufacture.

4,687,519

PAPER SIZE COMPOSITIONS

Peter T. Trzasko, Plainsboro; Martin M. Tessler, Edison; Ralph Trksak, Manville, and Wadym Jarowenko, Green Brook, all of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Dec. 20, 1985, Ser. No. 811,869

Int. Cl.[4] C08L *5/00, 3/00*

U.S. Cl. 106—211 **16 Claims**

1. A paper size capable of being emulsified under low shear conditions consisting essentially of water and 0.1 to 15% by weight of at least one hydrophobic sizing agent selected from the group consisting of alkyl ketene dimers, anhydrides of fatty acids, maleated triglycerides, maleated alpha-olefins, maleated fatty acids, and substituted linear or cyclic dicarboxylic acid anhydrides and 0.4 to 30% by weight of a jet cooked dispersion of a hydrophobic starch ether or ester derivative wherein the ether or ester substitutent comprises a standard or unsaturated hydrocarbon chain of at least 5 carbon atoms or a dispersion of a corresponding derivative of gum.

4,687,520

ONE-COMPONENT FORMULATION FOR DETACKIFYING AND COAGULATING SYNTHETIC RESIN PAINT FRACTIONS IN WET DEPARATORS OF PAINT-SPRAYING INSTALLATIONS, AND THE USE THEREOF

Hans-Peter Seng, Siissen, Fed. Rep. of Germany, assignor to Zeller+Gmelin GmbH & Co., Eislingen, Fed. Rep. of Germany

Filed Jun. 7, 1985, Ser. No. 742,512

Claims priority, application Fed. Rep. of Germany, Jun. 7, 1984, 3421289

Int. Cl.[4] C08L *91/06*

U.S. Cl. 106—271 **5 Claims**

1. A one-component formulation for detackifying and coagulating synthetic resin paint fractions in an aqueous mixture to obtain a detackified paint sludge, which comprises

(a) 5 to 20% by weight of carnauba wax or raw montan wax, and

(b) 10 to 30% by weight of an aminoalcohol, aminoalcohol derivative or morpholine,

each relative to the weight of the formulation, the remainder of the formulation being represented by water.

4,687,521

RANDOMLY INTERSTRATIFIED CLAYS

Paul H. Nadeau, Lewiston, Me., assignor to National Research Development Corporation, London, England

Filed Oct. 30, 1984, Ser. No. 666,614

Claims priority, application United Kingdom, Mar. 2, 1984, 8405531

Int. Cl.[4] C04B *14/20*

U.S. Cl. 106—291 **20 Claims**

1. A method of synthesising a randomly interstratified clay, comprising:

(i) saturating (replacing all the exchangeable cations of) a first clay with alkali metal ions, removing any excess alkali metal ions, and forming the saturated clay into a suspension containing no suspended particles exceeding 10^{-7} m equivalent spherical diameter,

(ii) saturating a second clay, which is a different clay from said first clay, with alkali metal ions, removing any excess alkali metal ions, and forming the saturated clay into a suspension containing no suspended particles exceeding 10^{-7} m equivalent spherical diameter,

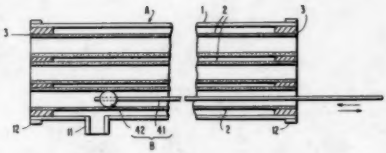
(iii) mixing the suspensions from (i) and (ii) to form a mixed suspension, and

(iv) sedimenting the mixed suspension, the sediment being the synthetic randomly interstratified clay.

4,687,522
METHOD FOR WASHING INNER SURFACE OF TUBULAR PERMEABLE MEMBRANE

Masahiko Hayashi, and Hiroshi Iwahori, both of Osaka, Japan, assignors to Nitto Electric Industrial Co., Ltd., Osaka, Japan

Filed Aug. 2, 1985, Ser. No. 761,724
Claims priority, application Japan, Dec. 11, 1984, 59-261193
Int. Cl.[4] B08B 9/04
U.S. Cl. 134—8 9 Claims



1. A method for washing an inner surface of a tubular permeable membrane which comprises:

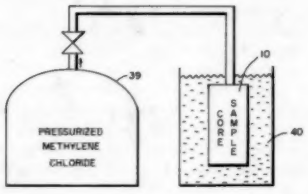
(a) inserting a washing device comprising an elastic rod-like support and a friction piece, attached to an end of the support, having a hardness of from about 10° to 30° measured according to JIS K-6301, 5-2 within the tubular permeable membrane so that the friction piece contacts with the inner surface of the membrane; and

(b) operating the support to reciprocate the friction piece within the tubular permeable membrane to thereby act a rubwashing force of from about 0.1 to 1.0 kg/cm^2 due to the contact between the inner suface of the tubular permeable membrane and the friction piece so as to remove contaminants adhered to the inner surface of the tubular permeable membrane, wherein the moving speed of the friction piece is from about 0.2 to 2.0 m/sec.

4,687,523
METHOD FOR CLEANING A CORE SAMPLE FROM A SUBTERRANEAN FORMATION OF SOLID CONTAMINANT PARTICLES

Arthur C. Hall, Dallas; E. Frank Schultz, Arlington, and Ludwig D. Wiener, Dallas, all of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 766,384, Aug. 16, 1985. This application Jul. 30, 1986, Ser. No. 890,989
Int. Cl.[4] B08B 30/00
U.S. Cl. 134—30 2 Claims



1. A method for cleaning a core sample from a subterranean formation of solid contaminant particles, comprising the steps of:

(a) filling said core sample under pressure with a volatile organic liquid in which said solid contaminant particles are insoluble,

(b) rapidly heating said liquid-filled core sample by immersion into a heated medium to dynamically evolve gas or vapor from said heated organic liquid to thereby sweep said insoluble solid contaminant particles from within said core sample to the outer surface of said core sample, and

(c) removing said solid contaminant particles from the outer surface of said core sample.

4,687,524
METHOD OF FORMING TO A FINISHED SIZE VEHICLE WHEELS MADE OF A HEAT-TREATABLE ALUMINUM ALLOY

Otto Berg, Asker, Norway, assignor to Ardal OG Sunndal Verk A.S., Oslo, Norway

Filed Nov. 26, 1985, Ser. No. 802,220
Claims priority, application Fed. Rep. of Germany, Nov. 27, 1984, 3443227
Int. Cl.[4] C22F 1/04
U.S. Cl. 148—11.5 A 3 Claims

1. A method of forming an aluminum alloy wheel rim to a desired finished size, said method comprising:

pressing a sheet of aluminum alloy material to form a wheel rim having a diameter less than, but not smaller than 98.7% of, said desired finished size;

subjecting said wheel rim to a solution heat treatment operation and thereby expanding said diameter to a size greater than said desired finished size;

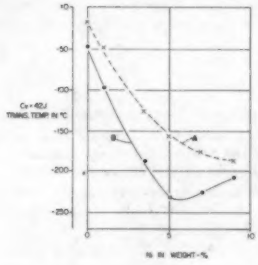
positioning said wheel rim, while substantially at the temperature thereof when removed from the solution heat treatment, in a calibration tool comprising two dies on a common arbor, said dies being located to define said desired finished size; and

cooling said wheel rim and thereby causing said rim to shrink tightly onto said dies to said desired finished size.

4,687,525
WORKED LOW-TEMPERATURE TOUGH FERRITIC STEEL

Franz-Josef Biniasz; Bernhard Engl; Axel Füchs, and Margit Hüser, all of Dortmund, Fed. Rep. of Germany, assignors to Hoesch Stahl AG, Fed. Rep. of Germany

Filed Aug. 30, 1985, Ser. No. 771,305
Claims priority, application Fed. Rep. of Germany, Sep. 3, 1984, 3432337
Int. Cl.[4] C22C 38/08
U.S. Cl. 148—336 5 Claims



1. A worked, weldable, low temperature tough, ferritic steel consisting of

0.015 to 0.08% C
0.1 to 0.5% Si
0.3 to 0.6% Mn
<0.015% P
<0.015% S
4 to 7% Ni
0.15 to 0.25% V
0.020 to 0.030% N
0 to 1.5% Cu

the rest iron and unavoidable impurities in normal amounts, said worked steel suitable for construction parts to be used at

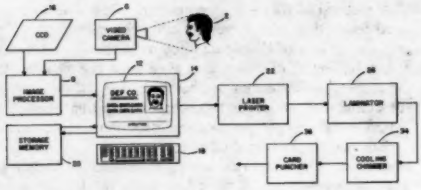
low temperatures, said steel having a nickel content reduced in comparison to that of the known steel X8Ni9.

4,687,526

METHOD OF MAKING AN IDENTIFICATION CARD

Ronald A. Wilfert, Boston, Mass., assignor to Identification Systems Company L.P., Acton, Mass.

Filed Jan. 8, 1986, Ser. No. 817,242
Int. Cl.⁴ B32B *31/12, 31/20*
U.S. Cl. 156—64 **1 Claim**



1. The method of fabricating an identification card comprising the steps of

recording an identification image in the form of a first set of digital data,

processing said first set of data to produce a visible reproduction of said image,

providing a second set of digital data representing additional identification information,

forming a visual image of both of said set of data,

recording both of said sets of data in a permanent memory,

printing by means of a laser printer a visual pattern controlled by said sets of data on a sheet of paper, and

laminating said paper between two sheets of thermoplastic material, at least one of which is transparent to visible light, with sufficient heat and pressure to cause said plastic to penetrate interstices between the fibers of said paper.

4,687,527

METHOD OF FORMING FLOCK PATTERNS

Shigehiko Higashiguchi, Tokyo, Japan, assignor to Kabushiki Kaisha Tokyo Horaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 523,469, Aug. 16, 1983, abandoned. This application Aug. 28, 1985, Ser. No. 770,192
Int. Cl.⁴ B32B *31/20, 5/02, 27/24*
U.S. Cl. 156—72 **5 Claims**

1. A flock pattern forming method comprising the steps of:

(a) printing a solution of a synthetic resin capable of being cross-linked on a surface of a material using a screen printing process, on which a predetermined pattern is to be formed thereby forming a flock transplanting adhesive layer having the form of said predetermined pattern on said surface;

(b) superposing flock solidly planted on a mount on said adhesive layer before said adhesive layer is dried;

(c) drying said adhesive layer by heating under a predetermined pressure thereby cross-linking the synthetic resin and attaching the tips of said flock on said mount to said surface of the material; and

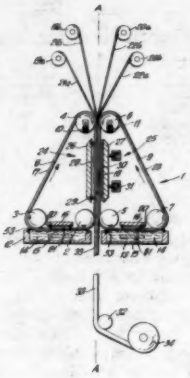
(d) peeling said mount thereby transplanting a portion of said flock to said surface of said material to form a flock pattern in said predetermined pattern.

4,687,528

PROCESS AND DEVICE FOR FABRICATION OF COPPER-LINED LAMINATES

Kurt Held, Alte Str. 1, D-7218 Trossingen 2, Fed. Rep. of Germany

Filed Apr. 24, 1986, Ser. No. 855,791
Claims priority, application Fed. Rep. of Germany, May 2, 1985, 3515629
Int. Cl.⁴ C25D *5/00*
U.S. Cl. 156—150 **24 Claims**



1. A process for fabrication of copper-lined laminates comprising the steps of:

galvanically depositing a copper layer on a portion of at least one of two endless press bands moving at equal speeds and arranged to define therebetween a reaction zone at which said press bands move generally parallel to each other;

moving said portion of said at least one press band through said reaction zone;

feeding into said reaction zone between said two press bands resin impregnated plastic webs to form therein a laminated structure consisting essentially of said plastic webs in said copper layer;

curing said laminated structure by application of heat and pressure thereto in said reaction zone to mold said copper layer together with said plastic webs; and

stripping said laminated structure from said press bands to form said copper-lined laminates.

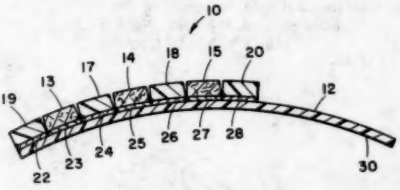
7. Apparatus for fabrication of copper-lined laminates comprising a pair of juxtaposed press band units each comprising three reversing drums and an endless press band strip arranged about said reversing drums for movement in a triangular path shaped as a right triangle, with said press bands being arranged so that they move parallel to each other during movement through one side of said triangular path to form a reaction zone therebetween, said reaction zone being arranged to extend vertically; galvanic bath means for precipitating copper on said press band strips including a trough suitable for receiving electrolytes therein and having an anode attached at at least one of said press band units at an external side of said press band strip along a part of said triangular path extending perpendicularly to said reaction zone wherein a surface of said press band strips constitutes a cathode, said part of said triangular path extending perpendicularly to said reaction zone having a size and position determined by the band surface constituting said cathode; and roll means having laminated plastic webs thereon arranged in the vicinity of said reaction zone at an upper end thereof for feeding said laminated plastic webs to between said press band strips in said reaction zone.

4,687,529

METHOD OF MAKING A REAGENT TEST DEVICE CONTAINING HYDROPHOBIC BARRIERS

Joseph Y. Wang, Elkhart, Ind., assignor to Miles Laboratories, Inc., Elkhart, Ind.

Division of Ser. No. 771,061, Aug. 30, 1985, Pat. No. 4,618,475.
This application May 15, 1986, Ser. No. 863,295
Int. Cl.[4] B32B *31/00*
U.S. Cl. 156—163 1 Claim



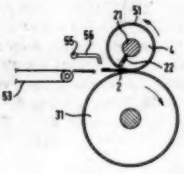
1. The process of forming a reagent test device comprising multiple reagent carrier matrices attached to a substrate with hydrophobic barrier pads of identical height to the reagent carrier matrices in physical contact with and separating adjoining spaced reagent carrier matrices, which comprises bending the substrate material from an original noncurved position so as to form a convex surface and then applying the reagent carrier matrices and hydrophobic barrier pads adjacent to each other on the convex surface of the substrate and thereafter permitting the substrate to return to its original noncurved position to obtain a test device having reagent carrier matrices and barrier pads of identical height in physical contact with each other to thereby protect the reagent carrier matrices from abrasion and to prevent liquid runover between adjoining spaced reagent carrier matrices.

4,687,530

METHOD OF AND APPARATUS FOR LINING A PIPE INSULATING SHELL CONSISTING OF MINERAL FIBERS WITH A FOIL

Peter Berscheid, Kurten-Spitze, and Jakob Friesdorf, Bergisch Gladbach, both of Fed. Rep. of Germany, assignors to Isover Saint-Gobain "Les Miroirs", Courbevoie, France

Filed Oct. 10, 1986, Ser. No. 917,541
Claims priority, application Fed. Rep. of Germany, Oct. 10, 1985, 3536174
Int. Cl.[4] B32B *31/00*
U.S. Cl. 156—215 12 Claims



1. A method of lining a pipe insulating shell formed of mineral fibers with a foil having a coating of heat activatible adhesive, comprising the steps of:

pre-positioning a free end of said foil with a downward angled orientation;

resting a leading edge of said free end of said foil on the upper surface of a heating roller positioned below a pipe insulating shell, whereby said adhesive is preliminary activated at said leading edge;

moving said roller towards said shell until said leading edge of said free end of said foil bears on said shell;

maintaining said leading edge pressed against said shell by said roller for a first dwell period; and

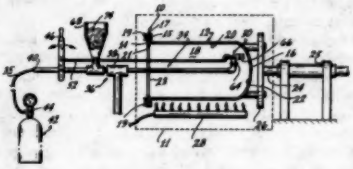
separately rotatably driving said shell and said roller in opposite directions and with the same peripheral speed to line said foil on said shell.

4,687,531

METHOD FOR CENTRIFUGAL SPRAY MOLDING OF THIN-WALLED STRUCTURES

Joseph B. Potoczky, 8975 Burke Ave., South Gate, Calif. 90280

Filed Jan. 26, 1982, Ser. No. 342,831
Int. Cl.[4] B29C *41/08*
U.S. Cl. 156—245 4 Claims



1. A method for molding thin-walled containers comprising the steps of:

providing a cavity mold having an open end and a closed end and defining an internal mold surface including an internal end surface;

rotating said mold about an axis extending between said ends, said axis being disposed horizontally;

heating said internal surfaces to a temperature greater than the melting temperature of a selected thermoplastic material;

introducing a nozzle into said cavity for spraying powdered thermoplastic material onto an area substantially smaller in the axial direction than the axial dimension of said mold cavity, said nozzle being movable between said ends, said nozzle being also rotatable between a radial position for spraying thermoplastic material onto said mold surface and an axial position for spraying thermoplastic material onto said end surface;

spraying the selected thermoplastic material onto said heated rotating mold surface at a rate such that substantially all of the sprayed powdered thermoplastic material melts substantially on contact with said internal surfaces;

moving said nozzle in an axial direction from said open end toward said closed end to fully cover said rotating mold surface with thermoplastic material;

rotating said nozzle near said closed end from said radial position to said axial position to cover said end surface with thermoplastic material;

rotating the nozzle from said axial position to said radial position;

moving said nozzle toward said open end;

repeating the movement of said nozzle between said ends including rotation thereof near the closed end to thereby form a mold liner of a desired substantially uniform thickness of thermoplastic material covering said internal surfaces;

removing said mold liner of thermoplastic material from said mold cavity; and

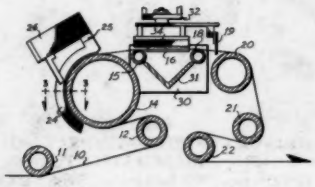
assembling a pair of such mold liners, each having a closed end, at their open ends to thereby make a tubular container closed at both ends.

4,687,532

SLIT SEALING METHOD AND APPARATUS

James R. Johnson, 3819 Greenhill Dr., Chamblee, Ga. 30341

Filed Jan. 9, 1986, Ser. No. 817,270
Int. Cl.[4] B32B 31/18
U.S. Cl. 156—251 7 Claims



1. A method for slit sealing thermoplastic sheet material, wherein said sheet material passes over support rolls and engages a heated knife, said method including the steps of passing said sheet material over a presealing roller before passing said material over said support rolls and contacting a band of said sheet material with heated air, subsequently engaging said band with said heated knife for slitting said sheet material into a plurality of pieces and sealing the slit edges, said step of engaging said band with said heated knife including the step of holding said knife at an angle with respect to the plane of said sheet material, said knife having a straight cutting edge extending through the plane of said sheet material and forming an acute angle between the lower surface of said sheet material, so that a bead is formed consistently on the upper surface of said sheet material during the slit sealing.

4,687,533

BONDING METHOD EMPLOYING MOISTURE CURABLE POLYURETHANE POLYMERS

Sidky D. Rizk, Westfield, and Harry W. S. Hsieh, Rahway, both of N.J., assignors to Essex Specialty Products, Inc., Clifton, N.J.

Division of Ser. No. 769,409, Aug. 26, 1985, Pat. No. 4,652,012.
This application Aug. 6, 1986, Ser. No. 893,735
Int. Cl.[4] C09J 5/02
U.S. Cl. 156—307.3 10 Claims

1. The method of bonding a material to a non-porous substrate which comprises joining said material and substrate with a moisture curable sealant composition and permitting said composition to cure in the presence of atmospheric moisture, said composition comprising at least one filler in combination with a moisture curable polyurethane polymer having terminal isocyanate groups and pendant silane groups having at least one hydrolyzable alkoxy group bonded to silicon, made by reacting

(1) an isocyanatosilane adduct having at least two isocyanato groups and

(2) an isocyanate different from (1) and having at least two isocyanato groups with

(3) a polyol,

said isocyanatosilane adduct being the reaction product of an isocyanate having at least three isocyanato groups with an organofunctional alkoxysilane.

4,687,534

PROCESS OF MAKING A FILM FACED EXPANDED POLYSTYRENE FOAM BOARD

Robert A. Alford, Sparta, and Mark C. Braemer, Mercerville, both of N.J., assignors to BASF Corporation, Parsippany, N.J.

Filed Jun. 17, 1985, Ser. No. 745,200
Int. Cl.[4] C09J 5/02
U.S. Cl. 156—308.6 10 Claims

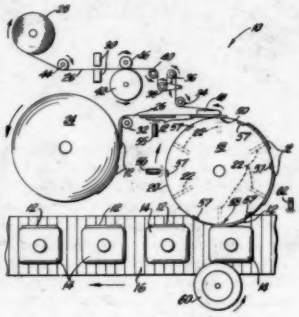
1. A process for producing an expanded polystyrene article having at least one surface coated with a heat laminated plastic film comprising laminating at least one surface of said article with a film composition comprising a double bubble of a high density film layer and a heat activated adhesive film layer, said adhesive film layer having a suitable melt index to adhere the high density film layer to said polystyrene article.

4,687,535

VACUUM DRUM LABELING SYSTEM

Helmut Voltmer, Park Ridge, N.J., assignor to New Jersey Machine, Inc., Fairfield, N.J.

Filed Mar. 28, 1986, Ser. No. 845,524
Int. Cl.[4] B32B 31/10
U.S. Cl. 156—361 4 Claims



1. In a labeling system for applying pressure sensitive labels to articles, wherein said labels are initially carried by a web, a drum having an axis and an outer cylindrical surface, a plurality of vacuum passages in open communication with said outer surface and equally spaced circumferentially around said drum, means for continuously advancing said web and delivering labels therefrom onto said outer surface of said drum at a label pick-up station at a predetermined speed of advance, and means for rotating said drum with a predetermined linear speed of said outer surface which is greater that said predetermined speed of advance at which labels are delivered to said outer surface, so that said outer surface slips on each said label until vacuum is applied to a vacuum passage, whereby the vacuum picks up the front edge of the label and labels are spaced uniformly on said drum from the pick-up station to a label applying station.

4,687,536

APPARATUS FOR CENTERING AND ATTACHING A REINFORCING RING TO A FLOPPY DISK

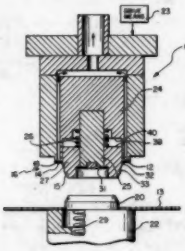
Kenichi Hiramatsu; Hidebumi Nozawa, both of Odawara City, and Takashi Yamauchi, Yokohama City, all of Japan, assignors to Kasei Verbatim Corporation, Sunnyvale, Calif.

Filed Jun. 16, 1986, Ser. No. 874,986
Claims priority, application Japan, Jul. 2, 1985, 60-145486
Int. Cl.[4] B32B 31/20; G11B 5/82
U.S. Cl. 156—556 5 Claims

1. In apparatus including a force translating mechanism mounted for movement to and from a resiliently mounted receiving member, for cooperatively positioning and attaching a reinforcing ring in coaxial relationship to a flexible recording disk, the improvement comprising:

(a) a cylindrical positioning member mounted for axial movement relative to said force translating mechanism and having a first reference surface corresponding to the inner diameter of such a reinforcing ring and a second reference surface, concentric with and smaller than said first reference surface, corresponding to the inner diameter of such a flexible disk, said cylindrical positioning member, in response to movement of said force translating

mechanism for attaching the reinforcing ring to the flexible disk, being moveable axially relative to said translating mechanism between (1) a first position in which said first reference surface causes said force translating mechanism to carry the reinforcing ring in a predetermined disk-attaching position, and (2) a second position engaging said receiving member in which said second reference surface causes the flexible disk to be located in a position concentric with the disk-attaching position of the reinforcing ring;



(b) said force translating mechanism, said positioning member, and said receiving member mutually cooperating during movement of said positioning member between its first and its second positions, to bring the reinforcing ring and the flexible disk into a bonding relationship during movement of said force translating mechanism toward said receiving member.

4,687,537

EPITAXIAL METAL SILICIDE LAYERS

Dorothy M. Hoffman, Hopewell Township, Mercer County; Frederick J. Tams, III, Hamilton Township, Mercer County, and Joseph T. McGinn, Raritan Township, Hunterdon County, all of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Apr. 15, 1986, Ser. No. 852,290
Int. Cl.[4] H01L *21/66*
U.S. Cl. 156—612 **6 Claims**

1. A process of forming a layer of a metal silicide on the surface of a silicon substrate comprising depositing at a temperature of from about 200° to 325° C. a first metal which will form an oxide in preference to silicon, said metal being selected from the group consisting of titanium, vanadium, zirconium, tantalum, chromium and hafnium, and depositing thereover a layer of a second metal selected from the group consisting of palladium and platinum whereby the silicide of the second metal is formed by epitaxial growth.

4,687,538

METHOD FOR GROWING SINGLE CRYSTALS OF THERMALLY UNSTABLE FERROELECTRIC MATERIALS

Antonio C. Pastor, Santa Monica, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 722,588, Apr. 12, 1985, abandoned. This application Mar. 19, 1986, Ser. No. 841,407
Int. Cl.[4] C30B *11/02, 11/14*
U.S. Cl. 156—616 R **13 Claims**

1. A method for growing a single crystal of a ferroelectric material selected from the group consisting of ferroelectric materials having the formula MH_2XO_4, where M is rubidium, cesium or ammonium; H is hydrogen or deuterium and X is phosphorus or arsenic, said method comprising the steps of:

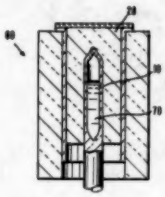
providing a sealed vessel which defines a constant volume cylindrical chamber having a top end, side walls and a bottom end, said chamber being substantially full of said ferroelectric material and moisture-free, said chamber having an axis extending longitudinally from the chamber top end to the chamber bottom end;

uniformly heating said ferroelectric material in said chamber to a sufficient temperature to uniformly melt said material only and not decompose said material;

providing a seed or nucleation point at the end where crystal growth is initiated; and

axially cooling said material to form a single solid crystal, said axial cooling being accomplished from the bottom end of said chamber by thermal conduction along the chamber axis predominantly and only minimally by radial thermal conduction through the vessel side walls, said axial cooling producing a crystal interface between said solid crystal material and melted material which is flat and perpendicular to said chamber axis, said crystal interface progressing from said chamber bottom end to said chamber top end due to said axial cooling to thereby provide uniform growth of said single crystal from the bottom end to the top end of said chamber.

12. A method for growing a single crystal of KH_2XO_4 wherein H is hydrogen or deuterium and X is phosphorus, said method comprising the steps of:



providing a sealed vessel which defines a constant volume cylindrical chamber having a top end, side walls and a bottom end, said chamber from about one-sixth to about one-third full of said KH_2XO_4 and moisture-free, said chamber having an axis extending longitudinally from the chamber top end to the chamber bottom end;

uniformly heating said KH_2XO_4 in said chamber to a sufficient temperature to uniformly melt said material only and not decompose said material; providing a seed or nucleation point at the end where crystal growth is initiated; and

axially cooling said material to form a single solid crystal, said axial cooling being accomplished from the bottom end of said chamber by thermal conduction along the chamber axis predominantly and only minimally by radial thermal conduction through the vessel side walls, said axial cooling producing a crystal interface between said solid crystal material and melted material which is flat and perpendicular to said chamber axis, said crystal interface progressing from said chamber bottom end to said chamber top end due to said axial cooling at a rate from about 0.1 mm to about 0.7 mm per hour to thereby provide uniform growth of said single crystal from the bottom end to the top end of said chamber.

4,687,539

END POINT DETECTION AND CONTROL OF LASER INDUCED DRY CHEMICAL ETCHING

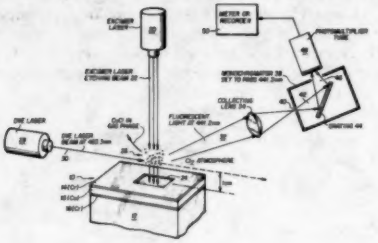
Francis C. Burns, Endicott; Russell W. Dreyfus, Mt. Kisco, and John R. Susko, Owego, all of N.Y., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Oct. 29, 1986, Ser. No. 924,519
Int. Cl.[4] C23F *1/02;* **B44C** *1/22;* **C03C** *15/00, 25/06*
U.S. Cl. 156—626 **20 Claims**

1. A method of radiation induced dry etching of a substrate having a layer of a first material superposed on a second material comprising:

(a) mounting said substrate in a reaction chamber containing a reactive gas, whereby said first material and said reactive gas form a first solid reaction product layer of said first material and said reactive gas on said first material by at least partial consumption of said layer of first material;

(b) pulsing etching laser means to apply, in a predetermined pattern corresponding to a region of said substrate, a beam of laser radiation to said region to vaporize said first solid reaction product layer in said region and eject said first reaction product in a gas phase from said region to expose said layer of first material which again forms a layer of said first solid reaction product with said reactive gas in said region and pulsing said etching laser means repeatedly to vaporize successive first solid reaction product layers from said region after they form following successive vaporizations thereof to expose said first material and,



after all of said first material in said region has been removed, to vaporize a second solid reaction product layer formed in said region by said second material and said reactive gas;

(c) after a delay following each pulsing of said etching laser means, pulsing probe beam means to direct a probe beam of narrow band light into a zone spaced from said region of said substrate, said delay being of such magnitude that said vaporized reaction products ejected from said region have reached said zone, said light of said probe beam having a first wavelength which induces said vaporized second reaction product in said zone to fluoresce light at a second wavelength unique to said second reaction product; and

(d) detecting said light of said second wavelength as an indication that all of said first material has been removed from said region of said substrate.

4,687,540

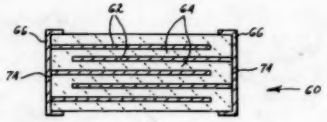
METHOD OF MANUFACTURING GLASS CAPACITORS AND RESULTING PRODUCT

Narendra N. Singhdeo, New Haven; Michael J. Pryor, Woodbridge; Charles J. Leedecke, Northford, and Norman G. Masse, Wallingford, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 811,846, Dec. 20, 1985. This application Jul. 23, 1986, Ser. No. 888,615

Int. Cl.[4] C03B *29/00;* **B32B** *17/06;* **C03C** *15/00*

U.S. Cl. 156—630 **16 Claims**



8. The process of producing a laminated glass capacitor comprising, comprising the steps of:

providing a glass;

providing a plurality of internal electrodes;

stacking and bonding said internal electrodes with layers of said glass between each of two of the internal electrodes to give electrostatic capacity;

providing a pair of external electrodes connected to the associated ones of said internal electrodes for taking out the electrostatic capacity;

the improvement comprising the steps of;

selecting said internal electrodes from the group consisting of deoxidized copper alloy and oxygen free copper alloy; and

forming said glass layers from a substantially pore free glass having a viscosity of between about 10^3 to about 10^8 at a temperature from about 600° C. to about 1025° C.

4,687,541

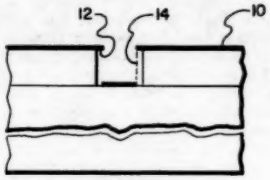
DUAL DEPOSITION SINGLE LEVEL LIFT-OFF PROCESS

James W. Penney, Thousand Oaks, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sep. 22, 1986, Ser. No. 909,804

Int. Cl.[4] B44C *1/22;* **C03C** *15/00, 25/06;* **B05D** *5/12*

U.S. Cl. 156—643 **13 Claims**



1. A dual deposition liftoff process for forming a pattern of an integrated circuit on a substrate, comprising the steps of:

applying a photoresist to the substrate;

exposing the photoresist to an image of the pattern;

developing the photoresist to remove exposed portions of the photoresist and thereby form sidewalls which define the pattern on the substrate;

depositing a thin layer of sealing material on top of the remaining photoresist and on uncovered portions of the substrate, the sealing material being suitable for incorporation into the integrated circuit;

exposing the photoresist to an etchant whereby the sidewalls of the photoresist are etched and the thin layer of sealing material is undercut, thus forming a lip which overhangs the sidewall;

depositing a layer of integrated circuit material on top of the thin layer but not on the sidewalls which are protected from deposition by the overhanging lip; and

lifting off the photoresist with its overlying thin layar and its layer of integrated circuit material.

4,687,542

VACUUM PROCESSING SYSTEM

Cecil J. Davis, Greenville; Robert Matthews, Plano, and Randall C. Hildenbrand, Richardson, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 24, 1985, Ser. No. 790,924

Int. Cl.[4] H01L *21/02*

U.S. Cl. 156—643 **42 Claims**

1. A load lock comprising:

a chamber having a vacuum-sealable lid;

space within said chamber for a wafer carrier having a door; and

a door opener, positioned inside said load lock in proximity to said space for a wafer carrier,

whereby said door opener can open and close the door of the wafer carrier while said chamber is under vacuum.

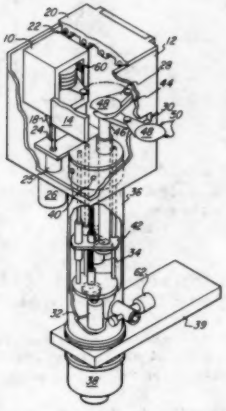
32. A method for fabricating integrated circuits, comprising the steps of:

(a) providing a plurality of wafers in a wafer carrier box, said wafer carrier box having a vacuum sealable door;

(b) placing said wafer carrier box into a load lock attached to a process station,
said lock having a vacuum sealable lid;

(c) closing said lid and pumping down said load lock to a pressure less than 10 to the −4 Torr;

(d) opening said door of said wafer carrier and extending a transfer arm into said wafer carrier, to remove a selected one of said wafers therefrom;



(e) transferring wafers
in a desired sequence from said wafer carrier to said process station and back
by extending said transfer arm through a port between said load lock and said process station, and

(f) closing said door of said wafer carrier, closing said port in said adjacent processing chamber, and raising the pressure of said load lock to approximately atmospheric,
so that said wafers remain in vacuum inside said wafer carrier and said door of said wafer carrier is held closed by differential pressure; and

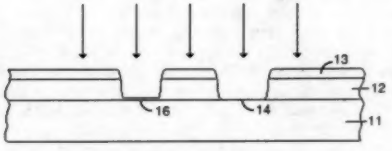
(g) removing said wafer carrier from said load lock.

4,687,543

SELECTIVE PLASMA ETCHING DURING FORMATION OF INTEGRATED CIRCUITRY

Christopher D. Bowker, San Jose, Calif., assignor to Tegal Corporation, Novato, Calif.

Filed Feb. 21, 1986, Ser. No. 832,047
Int. Cl.⁴ B44C *1/22*; C03C *15/00, 25/06*
U.S. Cl. 156—643 **7 Claims**



1. A method for selectively etching an insulating layer overlying a body of material including silicon comprising the steps of:

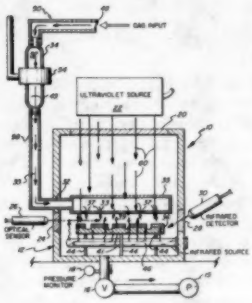
subjecting said layer to a plasma discharge in a gas mixture containing sulfur hexafluoride and a fluorocarbon wherein the flow rate of said sulphur hexafluoride is approximately equal to or greater than the flow rate of said fluorocarbon.

4,687,544

METHOD AND APPARATUS FOR DRY PROCESSING OF SUBSTRATES

Richard L. Bersin, Orange, Conn., assignor to Emergent Technologies Corporation, New Haven, Conn.

Continuation of Ser. No. 735,446, May 17, 1985, abandoned.
This application Apr. 14, 1986, Ser. No. 851,108
Int. Cl.⁴ H01L *21/306*; B44C *1/22*; C03C *15/00*; B29C *37/00*
U.S. Cl. 156—643 **22 Claims**



1. A method for dry process treatment of the surface of a substrate, the method comprising:

a. exposing the surface to a gas comprising at least one reactive specie for reacting with the surface, said gas being substantially free of electrically charged particles; and

b. simultaneously irradiating the surface with a source of electromagnetic radiation comprising collimated ultraviolet radiation wherein said source is maintained in a fixed position relative to said surface.

4,687,545

PROCESS FOR STRIPPING TIN OR TIN-LEAD ALLOY FROM COPPER

Ann S. Williams, Southbury, and Raymond A. Letize, West Haven, both of Conn., assignors to MacDermid, Incorporated, Waterbury, Conn.

Filed Jun. 18, 1986, Ser. No. 875,614
Int. Cl.⁴ C23F *1/00*; B44C *1/22*; C03C *15/00, 25/06*
U.S. Cl. 156—651 **23 Claims**

1. In a process for stripping a layer of metal selected from tin and tin-lead alloys from a copper substrate the steps comprising:

subjecting said coated substrate to the action of a first stripper composition comprising an oxidant for the metal or metals of said layer and an acceptor for the cation or cations so oxidized until only a thin film of said layer remains on said substrate;

and thereafter subjecting said substrate to the action of a second stripper composition comprising an aqueous solution containing a mixture comprising an alkali metal hydroxide and an alkali metal chlorite until said thin film of metal has been removed.

4,687,546

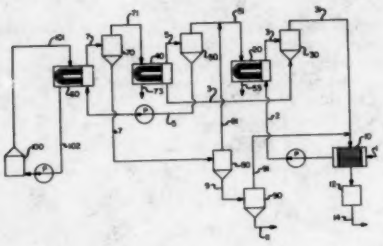
METHOD OF CONCENTRATING SLURRIED KAOLIN

Mark S. Willis, Milledgeville, Ga., assignor to Georgia Kaolin Company, Inc., Union, N.J.

Filed Jul. 19, 1985, Ser. No. 757,049

Int. Cl.[4] B01D *1/28, 3/06*

U.S. Cl. 159—2.1 11 Claims



1. A method for concentrating solids in an aqueous clay slurry by evaporating water therefrom comprising

a. passing the aqueous clay slurry through a plurality of evaporative heat exchangers in series flow in indirect heat exchange relationship with a heating vapor, at least a portion of the heating vapor in each of said evaporative heat exchangers comprising the water vapor evaporated from the aqueous clay slurry in passing through another of said adjacent evaporative heat exchangers, except in the downstream-most of the evaporative heat exchangers wherein the heating vapor is supplied from an independent source; and

b. passing the aqueous clay slurry exiting the downstream-most evaporative heat exchanger through at least one flash tank wherein additional water vapor is evaporated from the aqueous clay slurry thereby further concentrating the solids in the aqueous clay slurry.

4. A method of producing kaolin clay product slurry having a solids content of at least 65% by weight by concentrating solids in a lower solids content beneficiated aqueous kaolin clay slurry comprising passing the lower solids content beneficiated aqueous kaolin clay slurry in indirect heat exchange relationship with a heating vapor so as to evaporate water therefrom without contacting the beneficiated kaolin clay with the heating vapor.

4,687,547

PROCESS FOR THE SEPARATION OF MATERIALS OBTAINED BY MEANS OF HIGH PRESSURE EXTRACTION

Herbert Jekat, Schopfheim; Erwin Schütz, Palling, and Kurt Stork, Vohburg, all of Fed. Rep. of Germany, assignors to SKW Trostberg Aktiengesellschaft, Trostberg, Fed. Rep. of Germany

Filed Mar. 22, 1985, Ser. No. 715,090

Claims priority, application Fed. Rep. of Germany, Apr. 17, 1984, 3414562

Int. Cl.[4] B01D *1/12, 1/22*

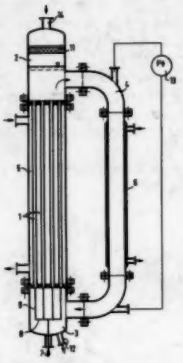
U.S. Cl. 159—3 5 Claims

1. Process for the separation of a material from a high-pressure extraction agent comprising:

passing a high-pressure extraction agent in which is dissolved material to be separated therefrom, into a bottom of a separator and from the bottom into a heat exchanger comprising a pipe connected to a head of said separator for receiving said material to be separated and said extraction agent, from said heat exchanger;

evaporating the extraction agent in the heat exchanger and removing it via a filter in the head; and

recycling said material from the heat exchanger in a forced circulation from the head to the bottom in a runback pipe



therebetween for discharge from the bottom or return to the heat exchanger.

4,687,548

METHOD AND APPARATUS FOR CONTROLLING DISTORTION OF FIBRE ORIENTATION IN A PAPER WEB

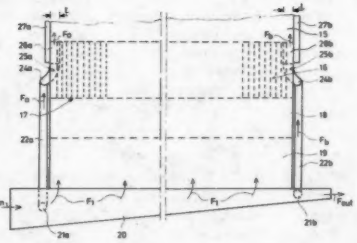
Erkki Ilmoniemi, Vaajakoski; Jouni Koskimies; Markku Lyytinen, both of Jyväskylä; Kari Pitkäjärvi, and Esa Ottelin, both of Jyväskylä, all of Finland, assignors to Valmet Oy, Finland

Filed Oct. 28, 1985, Ser. No. 791,910

Claims priority, application Finland, Oct. 31, 1984, 844276; Feb. 15, 1985, 850638

Int. Cl.[4] D21F *1/02*

U.S. Cl. 162—216 26 Claims



1. In a paper machine including a head box having a flow channel including a turbulence generator having main flow passages therethrough and a discharge channel through which a main flow of pulp suspension flows in a flow direction, a method for controlling distortion of fibre orientation in the paper web, comprising the steps of:

passing by-passing flows of pulp suspension in the flow direction through respective lateral passages situated in the flow channel at lateral sides of the head box substantially in the region of the turbulence generator, said bypass flows by passing said main flow passages of said turbulence generator, said lateral passages being separate from said turbulence generator and extending along at least a portion of the length of said turbulence generator with said turbulence generator being situated between said lateral passages; and

adjusting at least one of the magnitude and mutual relationship of the speeds of said pump suspension by-pass flows with respect to the speed of the main pulp suspension flowing through said turbulence generator main flow passages to produce a transverse flow in the pulp suspension discharged from the head box having a speed which compensates for the distortion in the fibre orientation to thereby control the distortion of the fibre orientation.

15. In a paper machine including a head box having a flow channel including a turbulence generator having main flow passages therethrough and a discharge channel through which a main flow of pulp suspension flows in a flow direction, apparatus for controlling distortion of fibre orientation in the paper web, comprising:

a pair of lateral passages situated in said head box flow channel at respective lateral sides of said head box substantially in the region of the turbulence generator, said lateral passages bypassing said main flow passages of said turbulence generator, said lateral passages being separate from said turbulence generator and extending along at least a portion of the length of said turbulence generator with said turbulence generator being situated between said lateral passages;

means for passing by-pass flows of pulp suspension through said lateral passages in the flow direction; and

means for adjusting at least one of the magnitude and mutual relationship of the speeds of said pump suspension by-pass flows with respect to the speed of the main pulp suspension flowing through said turbulence generator main flow passages to produce a transverse flow in the pulp suspension discharged from the head box having a speed which compensates for the distortion in the fibre orientation to thereby control the distortion of the fibre orientation.

4,687,549

HYDROFOIL BLADE

Otto J. Kallmes, Danvers, Mass., assignor to M/K Systems, Inc., Danvers, Mass.

Continuation-in-part of Ser. No. 817,034, Jan. 8, 1986, abandoned. This application Dec. 30, 1986, Ser. No. 947,883

Int. Cl.[4] D21F *1/48, 1/54*

U.S. Cl. 162—352 **12 Claims**

1. A hydrofoil blade for use in a paper making machine of the type wherein hydrofoil blades are positioned beneath a forming medium and extended in the cross machine direction relative to said forming medium for draining water through said forming-medium while a paper web is being formed on said forming medium and for forming said paper web, said hydrofoil blade comprising a forming medium bearing surface lying in a first plane and having a leading edge, and a trailing edge lying in a second plane parallel to said first plane, a first trailing surface diverging downward relative to said forming medium bearing surface from a first crease line to a second crease line, a first boundary forming surface extending from said second crease line to a third crease line in a third plane which is located intermediate of and parallel to said first plane and said second plane, and at least one other pair of trailing and boundary forming surfaces extending in tandem between said third crease line and said trailing edge, each additional of said boundary forming surfaces lying in a plane which is located intermediate of and parallel to said second and third planes, the last of said boundary forming surfaces lying in said second plane and extending to said trailing edge, consecutive of said planes being spaced from each other in the range of about 0.05 millimeters to about 4 millimeters.

4,687,550

WATER DISTILLER

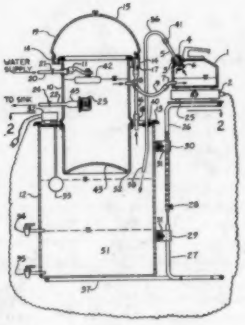
Man J. Wong, 61 Rand Street, Hamilton, Ontario L8J 1A5, Canada

Filed Jun. 17, 1985, Ser. No. 745,860

Claims priority, application Canada, Dec. 19, 1984, 470477

Int. Cl.[4] B01D *3/02;* **C02F** *1/04*

U.S. Cl. 202—165 **25 Claims**



1. A water distiller assembly comprising:

a boiling chamber comprising a vessel having heating means operatively associated therewith for heating supply water in said vessel;

a steam conduit means for delivering a steam generated in said boiling chamber to a condensing chamber where steam is condensed;

a condenser vessel that is open at the top, a condensing chamber cover which fits onto said condenser vessel and a cooling tank;

said condensing chamber cover has a large round opening at the center for accepting and supporting said cooling tank;

said cooling tank comprising a cylindrical vessel that is open at the top and is smaller in size than said condenser vessel so that it may be fitted into said condensing chamber cover and be supported on said cover;

said condensing chamber comprises said condenser vessel, said condensing chamber cover and the lower portion of said cooling tank;

a trough means that hangs from the top rim of said cooling tank and on the outside of said cooling tank;

a vertical conduit means connecting said trough means at its lowest level to said condensing chamber and forming a spout of said trough means;

a dome cover means that rests on the outer wall of said trough means;

said boiling chamber comprising a cylindrical spout to which a rubber stopper is fitted to form an air tight chamber;

said steam conduit means passing through said rubber stopper serves to deliver steam from said boiling chamber to said condensing chamber;

a baffle means attached to the end of said steam conduit means inside said boiling chamber serves to prevent splashes from boiling water from entering said steam conduit means;

a detachable splice connection, between said boiling chamber and said condensing chamber cover, along said steam conduit means to permit easy disconnection of said boiling chamber from said condensing chamber;

a rubber sealing means mounted on said condensing chamber cover and through which said steam conduit means passes

so that said steam conduit means can slide up and down said rubber sealing means to permit easy disconnection of said boiling chamber from said condensing chamber.

4,687,551

POROUS FILMS AND METHOD OF FORMING THEM

Robin C. Furneaux, Shenington; William R. Rigby, Banbury, and Alexander P. Davidson, Shipston-on-Stour, all of England, assignors to Alcan International Limited, Montreal, Canada

Filed Oct. 10, 1985, Ser. No. 786,334

Claims priority, application United Kingdom, Oct. 17, 1984, 8426264

Int. Cl.[4] C25D *11/04*

U.S. Cl. 204—11 **19 Claims**

1. An anodic aluminium oxide film (12) having pores extending from one face of the film to the other,

including a system of larger pores (14) extending in from one face (16) a distance h into the film, the larger pores having a diameter d near their inner ends, and a system of smaller pores (22, 24) extending in from the other face (26) a distance s into the film, the smaller pores having a substantially uniform minimum diameter p,

the system of larger pores interconnecting with the system of smaller pores, such that the inner ends of one or more smaller pores are joined to the inner end of a larger pore and there are substantially no blind larger pores,

wherein

$d = 10$ nm–2 microns,

p is at least 2 nm but less than 0.5 d, and

$s = 10$ nm–1.0 micron.

4,687,552

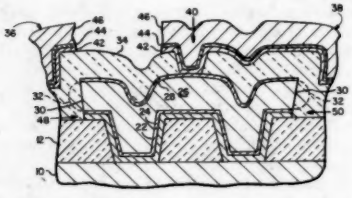
RHODIUM CAPPED GOLD IC METALLIZATION

Stephen R. Early, Beaverton, and Daniel Grogan, Portland, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Dec. 2, 1985, Ser. No. 803,703

Int. Cl.[4] C25D *5/02, 5/50*

U.S. Cl. 204—15 **17 Claims**



1. A metallization process for interconnecting elements on a integrated circuit chip, comprising:

forming electrical contact openings in a first, surface dielectric layer on the chip;

depositing a first metallization on the first dielectric layer in accordance with a first predetermined pattern, including into said contact openings, the first metallization having sidewalls generally normal to the first dielectric layer;

annealing the chip at a temperature T sufficient to relieve mechanical stresses in the metallization;

depositing a second dielectric layer on the chip to cover the first dielectric and the first metallization including the sidewalls thereof; and

depositing a second metallization on the second dielectric in accordance with a second predetermined pattern, including a contact electrically interconnecting the second metallization and a portion of the first metallization and a conduction line at a predetermined spacing from one of the sidewalls of the first metallization;

the step of depositing the first metallization including sequentially depositing a layer of a first metal onto the first dielectric and into the contact openings and a layer of a second metal atop the first metal and extending to edges coextensive with said sidewalls;

the first metal being a highly conductive metal having a first rigidity characteristic and the second metal having a second rigidity characteristic, such that the second metal is more rigid than the first metal at annealing temperature T and thereby maintains the first metallization through annealing in a shape substantially as deposited.

4,687,553

UNITIZED ELECTRODE-INTERCELL CONNECTOR MODULE

Frank Solomon, Great Neck, N.Y.; Charles Grun, Matawan, N.J.; Donald W. Abrahamson, Painesville, Ohio; James J. Stewart, Chardon, Ohio, and Marilyn J. Niksa, Concord, Ohio, assignors to Eltech Systems Corporation, Boca Raton, Fla.

Filed May 30, 1985, Ser. No. 739,184

Int. Cl.[4] C25D *5/02*

U.S. Cl. 204—16 **25 Claims**

1. The method of producing a unitized electrode-intercell connector module of a bipolar electrode of the M-alkaline electrolyte-AgO types wherein M represents a suitable electronegative metal, which method comprises:

contacting an imperforate metal foil intercell connector with a metal platable plastic foam having interconnected pores;

electroplating the resulting foil-foam combination, with the plating forming reticulate metal while intermetallically electrobonding said metal to said imperforate metal foil;

pyrolyzing the resulting unitized combination, thereby removing plastic foam underlying said reticulate metal plate;

establishing a silver active material in the interstices of said reticulate metal plate whereby said plate is loaded with silver filling; and

sintering the silver of the loaded reticulate metal plate;

thereby forming said electrode-intercell connector module for a bipolar electrode.

4,687,554

ELECTROLYTIC APPARATUS AND PROCESS

Jieh-Hwa Shyu, Hackensack, N.J., assignor to OMI International Corporation, Warren, Mich.

Filed Feb. 3, 1986, Ser. No. 825,112

Int. Cl.[4] C25D *5/00*

U.S. Cl. 204—23 **4 Claims**

1. A process for effecting a rapid deposition of a metallic deposit on a substrate which comprises the steps of immersing a substrate in a body of electrolyte, cathodically electrifying the substrate, immersing at least one soluble anode in the electrolyte, anodically electrifying the anode to cause current to flow through the electrolyte between the substrate and the anode, and continuously withdrawing electrolyte in the vicinity of such soluble anode to provide a controlled rate of flow of electrolyte across the anode surface to achieve a substantially uniform mass transport rate across the fluid film on the surface of the anode, such flow being in a direction away from the anode surface and toward the substrate, with the flow velocity across the anode surface being within the range of 0.3 to about 6 feet per second.

4,687,555

APPARATUS FOR SELECTIVELY PLATING ELECTRICAL TERMINALS

Mark L. Smith, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 10, 1986, Ser. No. 929,044

Int. Cl.[4] C25D *5/02, 17/00*

U.S. Cl. 204—26 **7 Claims**

1. An apparatus for plating interior contact surfaces of elec-

trical terminals that are spaced apart and attached to a carrier strip, comprising:

a mandrel continuously rotated as strip fed electrical terminals are continuously fed to the mandrel, partially wrapped against the mandrel and exited from the mandrel;

a plurality of nozzles distributed about the mandrel's axis of rotation;

a plurality of anode extensions associated with and in communication with an anode, said plurality of anode extensions being mounted within said nozzles such that a portion of each said anode extension extends outwardly from an outer end of said nozzle;

aligning means to align said electrical terminals as they are wrapped against said mandrel, such that each of said terminals is aligned with one of said nozzles and mounted over one of said anode extensions, said anode extension being in alignment with the interior contact surface of said terminal;

a conduit supplying plating solution under pressure through the nozzles and upon the anode extensions and into the interiors of the terminals mounted on said anode extensions; and

a source of electrical potential for supplying electrical current flow from the anode and anode extensions through the plating solution and into the interiors of the terminals mounted on said anode extensions, thereby plating said interior contact surfaces of said terminals.

4,687,556

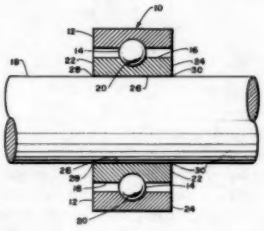
PREVENTING STRESS CORROSION CRACKING OF BEARINGS

Robert F. Sutton, Newbury Park, and Kathleen E. Kirkham, Sunland, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Dec. 19, 1985, Ser. No. 811,967

Int. Cl.[4] C25D *5/34*

U.S. Cl. 204—29 **14 Claims**



1. A method of inhibiting stress corrosion cracking of a bearing of the type installed on a shaft with an interference fit said bearing including an inner ring having a substantially cylindrical inner surface terminating at opposite ends and having radially extending endwalls, comprising the sequential steps of:

(a) shot peening the surface of the inner ring at least at and near the junctures of the endwalls with said cylindrical inner surface, said shot peening being performed with sufficient intensity to produce residual compressive stress which offsets at least a portion of the tensile stress resulting from installation interference fit;

(b) coating the shot peened surface with a thin metallic material; and

(c) baking the inner ring to remove hydrogen resulting from said coating.

4,687,557

GOLD ALLOYS AND GALVANIC BATH FOR THE ELECTROLYTIC DEPOSIT THEREOF

Heinz Emmenegger, 22, Chapeau-Râblé , 2300 - La Chaux-de-Fonds, Switzerland

Filed Feb. 24, 1986, Ser. No. 832,087

Claims priority, application Switzerland, Mar. 1, 1985, 00944/85

Int. Cl.[4] C25D *3/58, 3/62*

U.S. Cl. 204—44 **16 Claims**

1. Galvanic bath for the electroytic deposit of gold-copper-cadmium-zinc alloys, characterized by the fact that it contains a cyanide complex of gold, a cyanide complex of copper, a cyanide complex of cadmium, and a cyanide complex of zinc, and at least one complexing agent and one surface-active agent.

4,687,558

HIGH CURRENT DENSITY CELL

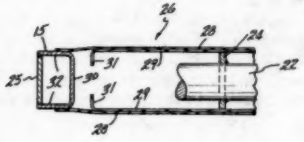
David D. Justice, and Kenneth E. Woodard, Jr., both of Cleveland, Tenn., assignors to Olin Corporation, Cheshire, Conn.

Continuation-in-part of Ser. No. 626,963, Jul. 2, 1984, Pat. No. 4,588,483. This application May 5, 1986, Ser. No. 859,956

The portion of the term of this patent subsequent to May 13, 2003, has been disclaimed.

Int. Cl.[4] C25B *1/34*

U.S. Cl. 204—59 R **28 Claims**



21. A method of operating a filter press membrane electrolytic cell having at least one cathode and one anode sandwiched about a permselective ion exchange membrane, comprising the steps of

a. operating the cell at greater than a 4.0 kiloampere per square meter current density at about one atmosphere pressure;

b. maintaining the cell at a voltage coefficient less than or equal to about 0.20 volts per kiloampere per square meter; and

c. maintaining a value for a constant in a cell voltage equation equal to the linear extrapolation to zero current density of the total cell voltage versus current density plot wherein the cell voltage equation is Vcell=Constant+-(Voltage Coefficient)(Current Density).

4,687,559

TREATMENT OF RESIDUES FOR METAL RECOVERY

Arthur E. Coburn, and Roger Deal, both of Blackfoot, Id., assignors to Helsco Metals Inc., Canada

Continuation-in-part of Ser. No. 590,410, Mar. 16, 1984, abandoned. This application Jan. 18, 1985, Ser. No. 692,805

Int. Cl.[4] C25C *1/20, 1/22*; C22B *11/08*

U.S. Cl. 204—110 **6 Claims**

1. A process for the extraction of at least one of gold, silver and selenium values contained in metallurgical residues, comprising the steps of:

(a) reacting a metallurgical residue slurred with an extractant solution of alkali metal cyanide and carbonate reagents, said reacting being performed in the presence of hydrogen peroxide, and in an agitated vessel at a pH in excess of 10, to yield a solution pregnant with at least one of gold, silver and selenium, and barren residue;

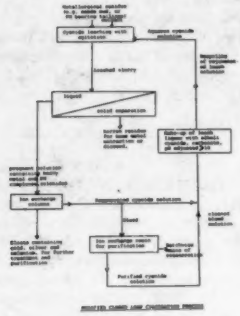
(b) separating the pregnant solution from the barren residue;

(c) recovering at least one of gold, silver and selenium from

the pregnant solution, and regenerating the cyanide reagent;

(d) removing residual gold, silver, selenium and solubilized impurities by an ion exchange cleaning process from the regenerated cyanide reagent;

(e) bringing the concentration of the regenerated cyanide reagent to the desired level by alkali metal cyanide and carbonate addition; and



(f) returning the reagent solution resulting from step (e) to step (a) to extract fresh residue.

4. A process according to claim 1, wherein the recovery of gold, silver and selenium from the pregnant solution in step (c) is carried out by electrolysis in an electrolytic cell including a cathode, an anode and electrolyte, by depositing the metals at the cathode and regenerating the cyanide reagent at the anode.

4,687,560

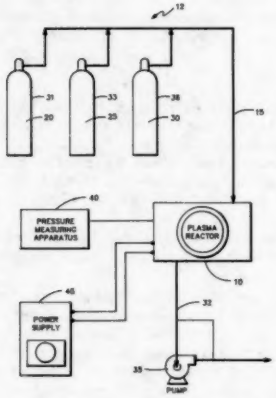
METHOD OF SYNTHESIZING A PLURALITY OF REACTANTS AND PRODUCING THIN FILMS OF ELECTRO-OPTICALLY ACTIVE TRANSITION METAL OXIDES

C. Edwin Tracy; David K. Benson, and Marta R. Ruth, all of Golden, Colo., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 16, 1985, Ser. No. 766,169

Int. Cl.[4] C22D 7/08; C05D 7/00

U.S. Cl. 204—164 **9 Claims**



1. A method of synthesizing thin films of electro-optically active transition metal oxides from a plurality of reactants in a reaction chamber, said process comprising the steps of:

(a) inserting a first reactant into said chamber;

(b) imparting second transition metal-bearing and third oxygen-bearing reactants into said chamber, the vapor pressures of said first, second and third reactants being effective for establishing a system pressure substantially less than atmospheric pressure; and

(c) inducing a plasma reaction among said reactants by plasma deposition, which plasma reaction consolidates said reactants, oxidizes said transition metal-bearing reactants and produces said thin films of electro-optically active transition metal oxides.

4,687,561

PROCESS AND APPARATUS FOR TREATMENT OF FLUIDS, PARTICULARLY DEMINERALIZATION OF AQUEOUS SOLUTIONS

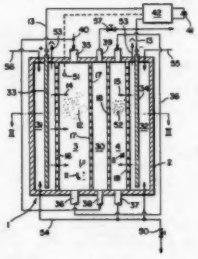
Gerhard Kunz, Ruhrstrasse 111, D-5628 Heiligenhaus, Fed. Rep. of Germany

Continuation of Ser. No. 573,940, Jan. 10, 1974, abandoned. This application May 20, 1985, Ser. No. 736,198

Claims priority, application Fed. Rep. of Germany, May 13, 1982, 3217990; Nov. 11, 1982, 3241681; Nov. 11, 1982, 3241682

Int. Cl.[4] B01D 13/02

U.S. Cl. 204—182.5 **39 Claims**



1. A process for demineralizing an aqueous liquid containing salts, comprising:

(a) passing the liquid through at least a first means for exchanging cations, a means for exchanging anions, and a second means for exchanging cations; the cation-exchange means containing hydrogen ions and the anion-exchange means containing hydroxyl ions, whereby cations and anions dissociated from the salts are exchanged for the hydrogen ions and the hydroxyl ions, thereby reducing the concentration of salts in the outflowing liquid;

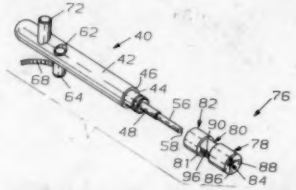
(b) applying electric potential across the direction of flow of the liquid whereby hydrogen ions and hydroxyl ions migrating in opposite directions are exchanged for the cations and anions in the means for exchanging ions thereby restoring said hydrogen and hydroxyl ions to the means, and whereby the displaced cations and anions are caused to migrate in opposite directions; and

(c) passing a flushing solution across the direction of the ion migration capable of receiving the cations migrating out from said first means for exchanging cations and the anions migrating out from the means for exchanging anions, whereby salts are formed and discharged with the flushing solution.

4,687,562
ANODE ASSEMBLY FOR SELECTIVELY PLATING ELECTRICAL TERMINALS

Mark L. Smith, and Richard M. Wagner, both of Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 23, 1986, Ser. No. 946,401
Int. Cl.[4] C25D *5/02, 17/00*
U.S. Cl. 204—206 20 Claims



1. An anode assembly for plating contact areas within socket terminals, comprising:

a conductive body member having an anode means extending forwardly from a body section, said body section including a reference surface related to said anode means, said anode means being concentric with said reference surface; and having a diameter smaller than the inner diameter of a terminal to be plated;

a dielectric shroud member having a profiled passageway extending axially therethrough and including a terminal receiving section and a forward passageway section extending through said terminal receiving section, said forward passageway section having a diameter just larger than the outer diameter of a said terminal to be plated, said shroud member including a reference surface related to said forward passageway section and further including a lead-in at the forward end of said profiled passageway; and

means for removably securing said dielectric shroud to said front end of said conductive body member and around said anode means; said shroud reference surface cooperable with said conductive body reference surface such that said forward passageway section of said shroud extends coaxially around said anode means; whereby

a said terminal is receivable into said forward passageway section of said shroud and said anode means extends coaxially into a forward end of said terminal.

4,687,563
ELECTROCHEMICAL MACHINE APPARATUS WITH DRILL-DEPTH AND RATE MONITOR

David V. Hayes, Painted Post, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Apr. 1, 1985, Ser. No. 718,528
Int. Cl.[4] B23H *9/14, 7/32;* B23B *39/04, 39/06*
U.S. Cl. 204—224 M 13 Claims

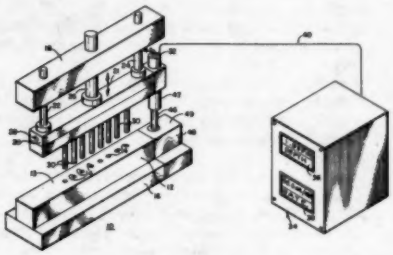
3. An electro-chemical machining apparatus for forming apertures in a workpiece comprising:

a workholder for supporting the workpiece in which said apertures are to be formed;

a manifold, movable with respect to said workholder, at a rate less than 0.001 inches per second, for supporting a plurality of cathodic drilling tubes and for distributing liquid electrolyte to each of such tubes;

a position sensor coupled between said workholder and said manifold for generating a depth signal proportional to the distance between said drilling tubes and a surface of said workpiece;

a drill rate monitor coupled to said position sensor and responsive thereto, said drilling rate monitor including differentiation means responsive to said depth signal for producing a drilling rate signal, said differentiation means including a field effect input operational amplifier; and

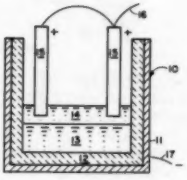


means, responsive to said differentiation means for displaying said drilling rate.

4,687,564
REFRACTORY LINING FOR ELECTROCHEMICAL CELL

Milton Blander, Palos Park, and Glenn M. Cook, Naperville, both of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 21, 1985, Ser. No. 736,575
Int. Cl.[4] C25C *3/24, 3/34;* C25F *1/14*
U.S. Cl. 204—243 R 10 Claims



1. Apparatus for processing a melt of molten iron in contact with a molten slag containing iron oxide, said apparatus comprising melt containing means including an electrically conductive refractory lining disposed for contact with an iron oxide containing melt, an anode in said melt containing means electrically separated from said refractory lining, and means for establishing a voltage between said refractory lining as cathode and said anode to reduce iron oxide to iron at the surface of said refractory lining in contact with the iron oxide containing melt, said refractory lining including a metal oxide selected from the group consisting of Mg chromites and MgO.

4,687,565
ELECTROLYTIC CELL FOR PRODUCING PERIODATES

Kaoru Hirakata, Yoshioka; Masaaki Mochizuki, Shibukawa; Hideo Kanai, and Reiichi Itai, both of Maebashi, all of Japan, assignors to The Japan Carlit Co., Ltd., Tokyo, Japan

Filed Mar. 25, 1986, Ser. No. 843,981
Claims priority, application Japan, Mar. 27, 1985, 60-60983
Int. Cl.[4] C25B *9/00; 11/02, 1/28*
U.S. Cl. 204—258 6 Claims

1. In an electrolytic cell having diaphragms, in which an anolyte of an acidic iodate solution is circulated in anode compartments and a catholyte selected from the group consisting of an alkali hydroxide solution and an inorganic acid is added into cathodic compartments, and in which iodates are electrolytically oxidized to periodates,

the improvement wherein said electrolytic cell comprises:

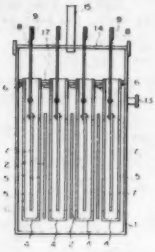
a cell body having substantially parallel long sides and opposite ends;

a plurality of cathodes mounted vertically in parallel to said long sides of said cell body and spaced at substantially equal intervals from each other;

a plurality of spaced apart open anodic box-like compartments mounted in said cell body between adjacent cathodes;

a plurality of cathodic compartments in said cell body, said cathodic compartments each comprising a space between two respective spaced apart anodic compartments, each cathodic compartment having at least one of said cathodes therein;

a plurality of plate separators arranged between adjacent anodic compartments to maintain the spacing between adjacent anodic compartments, each of said plate separators being offset from an adjacent plate separator so that said plate separators overlap each other to hold hydrogen cell gas generated from said cathodes to permit such hydrogen cell gas to travel to said ends of said cell body under said plate separators to permit removal of said



hydrogen cell gas at said ends of said cell body and to prevent alkaline mist from escaping from the catholyte;

at least one polyvinyl chloride diaphragm mounted on each opposite side of each of said anodic compartments;

an anolyte inlet coupled to a lower part of said anodic compartments for supplying an anolyte to said anodic compartments, and an anolyte outlet coupled to an upper part of the opposite sides of the respective anodic compartments;

a catholyte inlet coupled to a lower end of said cell body for supplying a catholyte to said cell body, and a catholyte outlet coupled to an upper part of said cell body;

a cell cover provided with both air intake holes and cell gas exhaust pipes for exhausting cell gas generated from said cathodes; and

perforated plate-like lids at both opposite ends of said cell body, said perforated lids being mounted between said cell cover and the upper level of said catholyte for receiving said hydrogen cell gas from said plate separators under said perforated lids, whereby most of alkaline mists accompanying said hydrogen cell gas are removed and refluxed by said perforated lids.

4,687,566

PROTECTIVE COLLAR FOR ANODE SPADE PIN

Ludwig Förster, Bad Säckingen; Alois Franke, Rheinfelden, and Reinhard Nobel, Wehr II, all of Fed. Rep. of Germany, assignors to Swiss Aluminium Ltd., Chippis, Switzerland

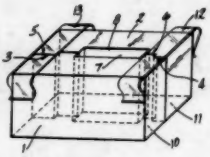
Filed Feb. 7, 1986, Ser. No. 827,082

Claims priority, application Switzerland, Mar. 6, 1985, 1010/85

Int. Cl.⁴ C25C *3/08*

U.S. Cl. 204—279 **13 Claims**

1. In a collar for protecting the anode spade or pin of an anode rod for an anode used in the electrolytic production of aluminum, the improvement which comprises an anode, an anode spade or pin of an anode rod projecting from said anode, a protective collar which surrounds the anode spade or pin projecting from the anode and which includes at least two, shaped carbon blocks each of which feature two close-fitting



end faces and recesses which jointly correspond to the cross-section of the anode spade or pin and surround the anode spade or pin, wherein said collar includes base areas which form a plane that is in contact with the anode.

4,687,567

ANTIFOULANTS FOR THERMAL CRACKING PROCESSES

Randall A. Porter, and Larry E. Reed, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 9, 1986, Ser. No. 849,919

Int. Cl.⁴ C10G *9/16*; C23C *18/12*

U.S. Cl. 208—48 AA **24 Claims**

1. A method for reducing the formation of coke on the metals which are contacted with a gaseous stream containing hydrocarbons in a thermal cracking process comprising the step of contacting said metals with an antifoulant selected from the group consisting of a composition comprising elemental indium or an organic compound of indium and tin and a composition comprising elemental indium or an organic compound of indium and antimony, wherein said tin and antimony are present in said composition in a form selected from the group consisting of elemental metals, organic compounds and inorganic compounds.

4,687,568

CATALYTIC HYDROFINING OF OIL

Simon G. Kukes, and Stephen L. Parrott, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sep. 19, 1986, Ser. No. 909,347

Int. Cl.⁴ C10G *45/00*

U.S. Cl. 208—251 H **13 Claims**

1. A process for hydrotreating a hydrocarbon-containing feed stream comprising the step of simultaneously contacting a substantially liquid hydrocarbon-containing feed stream, which also contains compounds of nickel, vanadium and sulfur, with a free hydrogen-containing gas and a catalyst composition comprising alumina, at least one compound of nickel, at least one compound of zirconium and at least one compound containing phosphorus and oxygen, under such hydrotreating conditions as to produce a hydrocarbon-containing stream having a reduced level of at least one of nickel, vanadium and sulfur,

wherein said catalyst composition has been prepared by a process comprising the steps of:

(A) impregnating a support material comprising alumina with a solution comprising water, at least one compound of nickel and at least one compound of zirconium;

(B) heating the material obtained in step (A) under such conditions as to substantially dry said material obtained in step (A),

(C) impregnating the substantially dried material obtained in

step (B) with a solution containing water and at least one compound containing phosphorus and oxygen;

(D) heating the material obtained in step (C) at a first temperature so as to at least partially dry said material obtained in step (C);

(E) heating the at least partially dried material obtained in step (D) at a second temperature, which is higher than said first temperature, so as to activate said at least partially dried material obtained in step (D).

4,687,569

STEAM STRIPPING PROCESS FOR SOLIDS SEPARATION IN OIL SHALE PROCESSING

John F. Patzer, II, Pittsburgh, Pa., and William G. Moon, Newton, N.J., assignors to Chevron Research Company, San Francisco, Calif.

Filed Sep. 27, 1985, Ser. No. 781,154
Int. Cl.[4] C10G *1/00*
U.S. Cl. 208—407 **11 Claims**

1. In a process for recovering oil from a kerogen containing slurry comprising oils with a boiling point greater than 650° F. and fine solids, the separation method comprising:

(a) atomizing said kerogen containing slurry;

(b) introducing said atomized slurry into a stripping zone;

(c) introducing superheated steam cocurrently with said atomized slurry in such a manner as to intimately mix said steam and said atomized slurry, said steam being introduced at a temperature of above about 1,000° F.

(d) causing a significant portion of the hydrocarbons in said slurry to vaporize;

(e) removing said vaporized hydrocarbons and steam from said stripping zone;

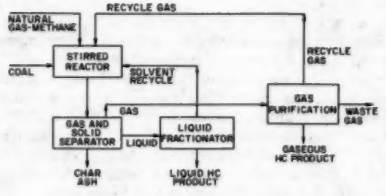
(f) removing said now-separated fine solids separately from said stripping zone.

4,687,570

DIRECT USE OF METHANE IN COAL LIQUEFACTION

Muthu S. Sundaram, Shoreham, and Meyer Steinberg, Melville, both of N.Y., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jun. 19, 1985, Ser. No. 746,471
Int. Cl.[4] C10G *1/00*
U.S. Cl. 208—431 **8 Claims**



1. A process for the liquefaction of carbonaceous materials to produce predominantly liquid hydrocarbons comprising heating said materials in a liquefaction reactor to a temperature in the range of 250° C. to 750° C., under pressure up to 6000 psi of a gas containing methane in the initial gas feed at 50–100% by volume for a residence time in the liquefaction reactor of about 20–120 minutes.

4,687,571

PROCESS FOR THE FROTH-FLOTATION OF A PHOSPHATE MINERAL FROM A PHOSPHATE-CARBONATE ORE

Esko T. Kari, Espoo; Jarmo Aaltonen, Siilinjarvi, and Elias U. Suokas, Espoo, all of Finland, assignors to Kemira Oy, Finland

Filed Oct. 10, 1985, Ser. No. 786,411
Claims priority, application Finland, Oct. 11, 1984, 843991
Int. Cl.[4] B03D *1/06*
U.S. Cl. 209—167 **8 Claims**

1. A process for the separation of phosphate minerals from a phosphate-carbonate ore comprising froth flotation of the phosphate minerals in the presence of a collector agent and a phenol polymer wherein said phenol polymer improves the selectivity of said process for phosphate minerals.

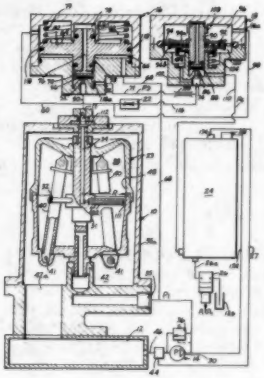
2. The process of claim 1 wherein said phenol polymer is a phenol-formaldehyde copolymer.

4,687,572

WATER-OIL SEPARATING SYSTEM INCLUDING CENTRIFUGAL TYPE SEPARATOR AND FLOW CONTROLS THEREFOR

Tadeusz Budzich, Moreland Hills, Ohio, assignor to Fluid Power Components, Inc., Cleveland, Ohio

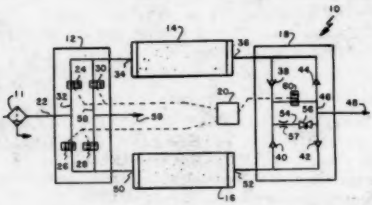
Continuation-in-part of Ser. No. 746,132, Jun. 18, 1985, Pat. No. 4,591,433, which is a continuation-in-part of Ser. No. 629,907, Jul. 11, 1984, Pat. No. 4,534,860. This application Apr. 21, 1986, Ser. No. 854,169
Int. Cl.[4] B01D *33/04*
U.S. Cl. 210—114 **15 Claims**



1. In a centrifugal filter separator system comprising a centrifugal type separator having a relatively stationary housing with an inlet port adapted to be supplied with pressurized oil and water by a pump having a suction port connected to reservoir, a clean oil outlet port connected to said reservoir, and a centrifuged water port, said centrifugal type separator including a rotatable drum having an inner surface, liquid disposed in said drum being adapted to be subjected to high centrifugal force upon rotation of said drum responsive to activation of said pump whereby the liquid will be disposed on said inner surface of said drum, said drum being journaled in said housing and functionally interconnected with said inlet port, liquid conducting means in said drum operable for interconnecting with said centrifuged water port for liquid flow, liquid at said inner surface of said drum, sensing means coacting with said water port and operable to detect the presence of centrifuged water at said inner surface, and flow control means coacting with said sensing means and operative to control the flow of liquid from the vicinity of said inner surface to said water port, said control means including means responsive to said sensing

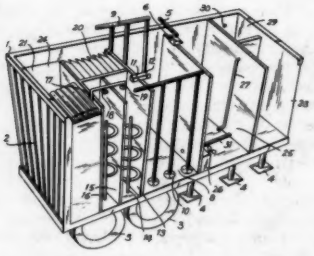
means operable to induce flow through said liquid conducting means during rotation of said drum as long as water is maintained against said inner surface by centrifugal force during such rotation.

4,687,573
SORBING APPARATUS
John D. Miller, Homer, N.Y., and Marcel G. Verrando, Ocala, Fla., assignors to Pall Corporation, Glen Cove, N.Y.
Filed Aug. 13, 1984, Ser. No. 640,356
Int. Cl.[4] B01D *15/00, 53/04*
U.S. Cl. 210—143 **12 Claims**



1. A sorbing apparatus for removing at least a portion of a component from a fluid having a first concentration of the component, said apparatus comprising at least one chamber having first and second ports and defining a fluid flow path between the first and second ports, the chamber including a bed of sorbent particles disposed in the fluid flow path, said sorbent particles including particles of carbon and being bound to one another by a polymeric binding agent wherein relative movement of the particles is prevented, and fluid control means for alternately directing the fluid having the first concentration of the component through the bed of sorbent particles wherein the bed of sorbent particles sorbs the component from the fluid and directing a purging fluid through the bed of sorbent particles wherein the bed of sorbent particles in regenerated.

4,687,574
WATER TREATMENT SYSTEM
Goran Hellman, Miami Lakes, Fla., assignor to The Munters Corporation, Fort Myers, Fla.
Continuation of Ser. No. 600,588, Apr. 13, 1984, abandoned, which is a continuation of Ser. No. 458,331, Jan. 17, 1983, abandoned. This application Mar. 11, 1985, Ser. No. 709,992
Int. Cl.[4] C02F *1/52*
U.S. Cl. 210—151 **18 Claims**



1. A portable water treatment system comprising:
means for introducing wastewater including gross solids and liquid into the system;
means for separating the gross solids from the liquid in the wastewater, said separating means producing a sludge from the gross solids;
means for storing and aerating the liquid;
means for flocculating the aerated liquid, the flocculating means including means for introducing a chemical flocculating agent into the aerated liquid and means for stirring the aerated liquid and the chemical flocculating agent;
means for sedimenting and clarifying the flocculated liquid, said sedimenting and clarifying means having a plurality of lamellae, said sedimenting and clarifying means producing a sediment and a clarified liquid;
means for disinfecting the clarified liquid;
means for digesting the sludge, said sludge digesting means producing a supernatant liquid from the sludge;
means for introducing the supernatant liquid from the sludge digesting means into the storing and aerating means; and
means for introducing the sediment from the sedimenting and clarifying means into the sludge digesting means;
wherein the chemical flocculating agent is introduced into the aerated liquid in a first chamber, wherein the chemical flocculating agent and the aerated liquid in the first chamber are supplied to a second chamber, and wherein the second chamber contains the stirring means.

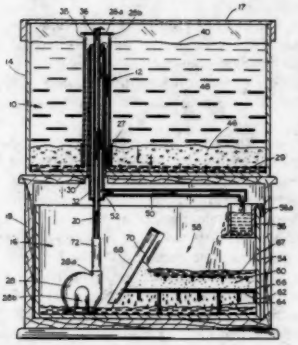
14. A portable water treatment system comprising:
means for introducing wastewater including gross solids and liquid into the system;
means for separating the gross solids from the liquid in the wastewater, said separating means producing a sludge from the gross solids;
means for storing and aerating the liquid;
means for flocculating the aerated liquid, the flocculating means including a trickle bed filter and means for aerating the output of the trickle bed filter, said means for aerating producing an activated sludge;
means for sedimenting and clarifying the flocculated liquid, said sedimenting and clarifying means having a plurality of lamellae, said sedimenting and clarifying means producing a sediment and a clarified liquid;
means for disinfecting the clarified liquid;
means for digesting the sludge, said sludge digesting means producing a supernatent liquid from the sludge;
means for introducing the supernatant liquid from the sludge digesting means into the storing and aerating means; and
means for introducing the sediment from the sedimenting and clarifying means into the sludge digesting means;
wherein the flocculating means further includes means for introducing a chemical flocculating agent into the aerating means.

4,687,575
AQUARIUM FILTERING SYSTEM
Ronald D. Grose, 4432 Pine, Omaha, Nebr. 68105
Filed Mar. 10, 1986, Ser. No. 837,698
Int. Cl.[4] A01K *63/04*
U.S. Cl. 210—169 **9 Claims**

1. An aquarium filter system, comprising:
a lower tank means having a particulate filter material therein adapted to filter water supplied thereto;
an upper tank means positioned above said lower tank means and having particulate filter material therein adapted to filter water supplied thereto;
a water pump means in said lower tank and having intake and outlet ports, said water pump means having its intake port in fluid communication with water filtered through the particulate filter material in said lower tank;
a vertically disposed water supply tube communicating between the outlet port of said water pump means and said upper tank whereby water filtered in said lower tank is supplied to said upper tank;
a vertically disposed water conduit means having its upper end in fluid communication with water filtered through the particulate filter material in said upper tank, and its lower end in operative communication with said lower

tank to supply water to the particulate filter material therein; and

said water conduit means including selectively adjustable water level regulating means adapted to constantly maintain a selected water level;



whereby water filtered in the upper tank is communicated to the lower tank, filtered, and pumped back into the upper tank.

4,687,576

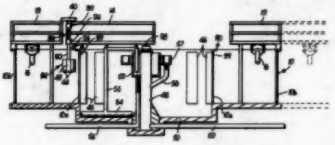
CURRENT PROPELLED WASTE WATER TREATMENT MECHANISM

John C. Hardison, 2500 W. Skelly, Tulsa, Okla. 74107

Filed Sep. 16, 1985, Ser. No. 776,517

Int. Cl.⁴ B01D *21/20*

U.S. Cl. 210—200 **7 Claims**



1. A sewage treatment system comprising:

an inner open top clarifying tank in which sludge settles out of the sewage and an outer open top aeration tank surrounding said inner tank in which the sewage is agitated before entering the clarifying tank;

a stationary bridge above the aeration tank;

stationary means mounted on said stationary bridge for causing a horizontally moving current of sewage within said aeration tank;

a movable bridge above said clarifying tank;

apparatus supported on said movable bridge and projecting into said clarifying tank for performing a certain operation within said clarifying tank as the apparatus moves with the movable bridge; and

a baffle depending from said movable bridge and projecting into said aeration tank for impingement of the baffle by the moving current in said aeration tank whereby to drive said apparatus in a prescribed path of travel within the clarifying tank without subjecting the contents of the clarifying tank to the agitation occuring in the aeration tank.

4,687,577

CONTAINER FOR THE PURIFICATION OF LIQUIDS

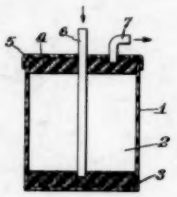
Karl-Heinz Reuter, Cologne, and Heinz Meckl, Bergisch Gladbach, both of Fed. Rep. of Germany, assignors to Agfa Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Sep. 2, 1986, Ser. No. 902,784

Claims priority, application Fed. Rep. of Germany, Sep. 14, 1985, 8526326[U]

Int. Cl.⁴ B01J *47/02*

U.S. Cl. 210—288 **2 Claims**



1. Container for the purification of photographic processing baths comprising a container bottom above which is a space containing an anion exchanger and comprising a closure device, characterised in that a porous compressible foam is arranged between the space containing said anion exchanger and the closure device; and that rigidly connected to the closure device are an inlet tube extending through the interior of the container to almost the bottom of the container and a discharge tube the inner open end of which is situated close to the closure device.

4,687,578

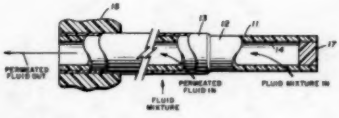
FLUID SEPARATION MEMBRANES

Donald J. Stookey, Creve Coeur, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 12, 1985, Ser. No. 807,928

Int. Cl.⁴ G01D *13/00*

U.S. Cl. 210—321.1 **12 Claims**



11. A fluid separation module comprising:

a. a generally cylindrical shell;

b. a tube sheet positioned in the shell at one end thereof, said tube sheet being sealed to the shell to prevent the flow of fluids around the tube sheet;

c. a bundle of hollow fiber membranes positioned in the shell and extending through the tube sheet, said membranes having a predetermined separation factor for one fluid with respect to another fluid;

d. said shell having an inlet for feeding a mixture of said fluids under pressure into said shell to contact the outer surfaces of said membranes to allow said one fluid to permeate the membranes to the interiors thereof; and

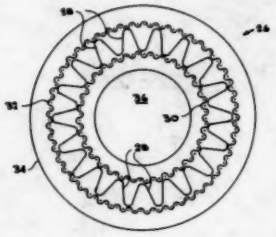
e. said membranes each having at a point remote from the tube sheet a portion adapted to allow more of said fluid mixture to pass through said portion to the interiors of the fibers, said portion being of sufficient length that the amount of said mixture passing through said portion is sufficient to sweep the permeated one fluid from the interior of said fiber.

4,687,579

SINTERED COMPOSITE MEDIUM AND FILTER

Werner Bergman, Pleasanton, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 2, 1986, Ser. No. 859,166
Int. Cl.[4] B01D *29/24*
U.S. Cl. 210—347 **13 Claims**



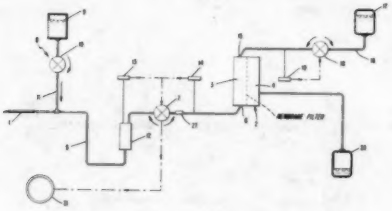
1. A filter media comprising a sintered composite of quartz fibers and stainless steel fibers having a filter efficiency of at least about 99.99% for 0.3 micron diameter particles, an operative temperature up to about 550° C., and flow resistance comparable to and tensile strength at least four times that of a standard high efficiency particulate air filter media.

4,687,580

MEMBRANE APPARATUS/PROCESS ADAPTED FOR PLASMAPHERESIS

Jean-Michel Malbrancq, Thiais; Elisabeth Bouveret, Paris, and René Angleraud, Feyzin, all of France, assignors to Rhone-Poulenc S.A., Courbevoie, France

Filed Jan. 10, 1983, Ser. No. 456,821
Claims priority, application France, Jan. 11, 1982, 82 00485
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—651 **37 Claims**



1. Apparatus for the withdrawal, fractionation and return of liquid materials from and to a donor source, comprising:

(i) means for withdrawing a liquid material from a donor source;

(ii) a membraneous filtration cell which comprises (1) a membrane separator, (2) a cell compartment downstream therefrom for enclosing that fraction of said liquid material which is filtered through said membrane separator and (3) a cell compartment upstream thereof for enclosing that fraction of said liquid material which is not filtered through said membrane separator;

(iii) conduit means establishing communicating relationship between said withdrawal means (i) and the inlet end of said upstream cell compartment (ii) (3), having reversible liquid material pumping means (x) operably engaged along said conduit means (iii) and pressure sensor means (xi) for the pressure of liquid material circulating in each conduit means (iii), said pressure sensor means being operably engaged along said conduit means (iii), between said pumping means (x) and the inlet end of said upstream cell compartment (ii)(3);

(iv) a collection vessel downstream from the outlet end of said upstream cell compartment (ii)(3) for that fraction of liquid material which is not filtered through the membrane separator;

(v) conduit means establishing communicating relationship between the outlet end of said upstream cell compartment (ii)(3) and said collection vessel (iv);

(iv) means for determining the volume of liquid material withdrawn from the donor source during a withdrawal stage;

(vii) means for returning the unfiltered liquid material fraction from said collection vessel (iv) to said donor source through said compartment (ii) (3) of said filtration cell upon predetermined completion of said withdrawal stage, by recycling same back to said donor source through said conduit means (v), said upstream cell compartment (ii) (3) and said conduit means (iii);

(viii) a collection vessel downstream from the outlet end of said downstream cell compartment (ii) (2) for that fraction of liquid material which is filtered through the membrane separator, and conduit means (ix) establishing communicating relationship between the outlet end of said downstream cell compartment (ii) (2) and said collection vessel (viii); and

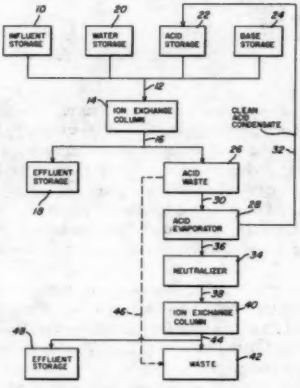
(xiii) means for ensuring desired pressures at the outlet end of said upstream cell compartment (ii) (3) upon withdrawal of liquid material from the donor source and at the inlet end of said upstream cell compartment (ii) (3) upon return of the unfiltered fraction of liquid material from the collection vessel (iv) to the donor source.

4,687,581

METHOD OF SEPARATING AND PURIFYING CATIONS BY ION EXCHANGE WITH REGENERABLE POROUS GLASS

Pedro B. Macedo, 6100 Highboro Dr., Bethesda, Md. 20817; Aaron Barkatt, Silver Spring, and Herbert G. Sutter, Gaithersburg, both of Md., assignors to Pedro B. Macedo, Bethesda, Md.

Filed Jan. 30, 1984, Ser. No. 574,986
Int. Cl.[4] C02F *1/42*
U.S. Cl. 210—670 **38 Claims**



1. A method of removing radioactive cations from a liquid containing the same by passage of said liquid through a regenerable ion exchange medium of porous silicate glass or silica gel characterized by an interconnected porous structure and a

plurality of ≡Si—O—Z groups wherein Z represents a non-radioactive cation selected from the group consisting of hydrogen, alkali metal, Group Ib metal, ammonium and mixtures thereof, said method comprising:

(a) contacting said ion exchange medium with said liquid whereby said non-radioactive cations of said ion exchange medium are displaced by said radioactive cations of said liquid to provide a plurality of groups of radioactive cations bonded to Si through divalent oxygen (—O—);

(b) contacting said ion exchange medium containing radioactive cations bonded thereto of step (a) with an aqueous solution of an acid to displace said radioactive cations with the proton of said acid thereby providing a plurality of ≡Si—O—H groups;

(c) regenerating said ion exchange medium by contacting the ion exchange medium of step (b) with an aqueous basic solution of an alkali metal or ammonium ion to provide a regenerated ion exchange medium having a plurality of ≡Si—O—A groups wherein A represents a non-radioactive cation selected from the group consisting of alklai metal, ammonium and mixtures thereof, and

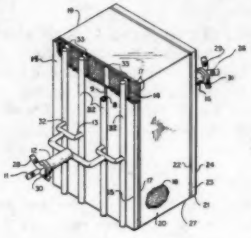
(d) contacting the regenerated ion exchange medium of step (c) with additional liquid containing radioactive cations thereby effecting a displacement of said non-radioactive cations with radioactive cations.

4,687,582

METHOD AND APPARATUS FOR OPERATING AND REGENERATING ION EXCHANGERS

Walter O. Dixon, 470 N. 1020 West, Provo, Utah 84601

Filed Dec. 23, 1985, Ser. No. 798,056
Int. Cl.[4] B01J *49/00*
U.S. Cl. 210—677 **19 Claims**



1. A process for operating and regenerating a fixed bed ion exchanger on a continuous basis without the need for moving the bed or closing down the operation during regeneration, said process comprising the steps of:

forming a fluid wall of the feed solution having a substantially uniform flow front and containing the ions to be removed and continuously flowing the feed solution as a fluid wall through a fixed ion exchange bed at a high rate of at least 8 cubic feet per minute per square foot of resin bed surface area exposed to and resisting flow of the fluid wall until the ion exchange bed becomes exhausted and in need of regeneration;

terminating the flow of feed solution and forming the fluid wall of a stripping solution which will remove the ions from the ion exchange bed and flowing the stripping solution as the fluid wall through the fixed ion exchange bed at the high rate until the activity of the bed has been restored;

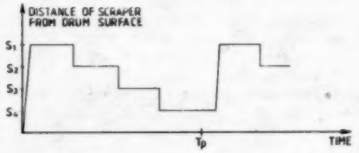
terminating the flow of stripping solution and again forming the fluid wall of the feed solution and continuously flowing the feed solution as the fluid wall through the fixed ion exchange bed at the high rate.

4,687,583

PROCEDURE FOR FILTERING LIME SLUDGE MEANT TO BE REGENERATED TO LIME

Matti Lankinen; Holger Engdahl; Raimo Kohonen; Jukka Niskanen, and Markku Kosonen, all of Savonlinna, Finland, assignors to Enso-Gutzeit Oy

Filed Mar. 12, 1986, Ser. No. 838,921
Claims priority, application Finland, Mar. 26, 1985, 851203
Int. Cl.[4] B01D *33/06*
U.S. Cl. 210—739 **5 Claims**



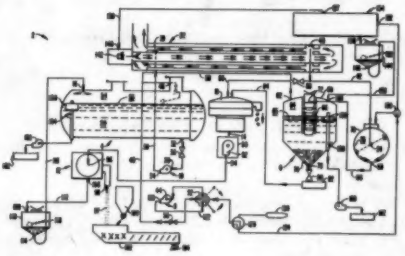
1. A procedure for filtering lime sludge meant to be regenerated to lime, comprising filtering a lime sludge suspension on a filter drum in continuous rotation by depositing lime sludge on the drum and detaching part of the superficial layer of the lime sludge on the drum with a scraper so that the deeper lime sludge layer on the drum, which by-passes the scraper, serves as filtering medium for the superficial layer that is detached, and controlling the filtering process to maintain the dry matter content of the lime sludge detached from the drum substantially constant, wherein the step for controlling the filtering process comprises detaching the superficial layer of lime sludge from the filter drum and checking the dry matter content of the lime sludge detached from the drum, increasing the speed of rotation of the drum incrementally when the dry matter content tends to decrease within a given control range of the speed of rotation and, after the control range has been used up, moving the scraper closer to the surface of the drum and detaching at least part of the deeper lime sludge layer on the drum, serving as filtering medium, and continuing the control based on the speed of rotation of the drum.

4,687,584

SLUDGE REMOVER AND PROCESSOR

William G. Urbani, Stockton, Calif., assignor to Industrial Innovations, Inc., Stockton, Calif.

Filed Aug. 19, 1985, Ser. No. 767,007
The portion of the term of this patent subsequent to Aug. 21, 2001, has been disclaimed.
Int. Cl.[4] B01D *45/12*
U.S. Cl. 210—769 **21 Claims**



1. A method for enhancing oil collection from a liquid mixture of oily and non-oily phases comprising the following steps:

subjecting the mixture to a partial vacuum at a first collec-

tion point to aid separation of the liquid mixture into an oil layer and remainder layer by the formation of bubbles in the liquid mixture;

removing oily phases from the oil layer at the first collection point;

directing remainder liquid from the remainder layer to a centrifuge;

centrifuging the remainder liquid to remove any solids therefrom and to aid subsequent oil separation of the centrifuged liquid;

passing centrifuged liquid from the centrifuge to a second collection point;

subjecting the centrifuged liquid at the second collection point to a second partial vacuum to further aid separation of the centrifuged liquid into a second oil layer and a second remainder layer by the formation of bubbles in the liquid mixture; and

removing oily phases from the second oil layer at the second collection point.

4,687,585

SEPARATION PROCESS UTILIZING CENTRIFUGAL ROTOR

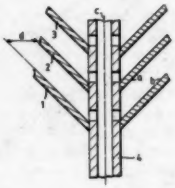
Colin Ramshaw, Norley, England, assignor to Imperial Chemical Industries plc, London, England

Filed Dec. 14, 1982, Ser. No. 449,693

Claims priority, application United Kingdom, Dec. 18, 1981, 8138327; Aug. 26, 1982, 8224531

Int. Cl.[4] B01D *17/038, 19/00*

U.S. Cl. 210—787 **6 Claims**



1. A process for separating at least one component of a fluid fossil fuel containing a plurality of phases of different densities, which process comprises:

charging the fluid fossil fuel to a rotor which is formed by mounting a permeable element on a rotatable shaft which is coaxial with the axis of the rotor, the permeable element having an interfacial area of more than about 500 meters^2/meters^3;

rotating said rotor so as to subject said fluid fossil fuel to a centrifugal force such that a more dense phase moves in a generally outward direction with respect to the axis of rotation of the rotor and a less dense phase moves in a generally inward direction with respect to said axis of rotation;

and collecting at least one hydrocarbon phase from said rotor.

4,687,586

OIL RECOVERY PROCESS AND SYSTEM

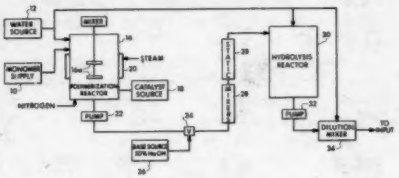
Perry A. Argabright, Larkspur, and John S. Rhudy, Littleton, both of Colo., assignors to Marathon Oil Company, Findlay, Ohio

Continuation of Ser. No. 533,108, Sep. 19, 1983, abandoned, which is a division of Ser. No. 275,594, Jun. 19, 1981, Pat. No. 4,433,727. This application Dec. 5, 1985, Ser. No. 805,977

Int. Cl.[4] C09K *3/00*

U.S. Cl. 252—8.551 **15 Claims**

1. A process for producing a partially hydrolyzed polyacrylamide having a preselected average molecular weight and molecular weight distribution for use in recovering oil from a subterranean oil-bearing formation, comprising: predetermining the injectivity and mobility properties of a partially hydrolyzed polyacrylamide required to meet the oil displacement demands of an oil-bearing formation by obtaining a core sample from the formation and subjecting the sample to tests simulating the passage of the partially hydrolyzed polyacrylamide through the formation during oil displacement; forming a solution of a water soluble acrylamide monomer capable of being polymerized; polymerizing said monomer in the presence of a polymerization catalyst, the proportion of catalyst present being regulated during polymerization to provide, an acrylamide polymer having an average molecular weight of



about 2 million to about 10 million and a molecular weight distribution of about 0.02 to about 0.22 as determined by the ratio $\sigma/\overline{M}$ where σ is the standard deviation of molecular weight of abundance of a molecular species present in the polymer and $\overline{M}$ is the average molecular weight of the polymer; contacting said polymer with a hydrolyzing agent in an amount to effect partial hydrolyzation of the polymer while maintaining the predetermined average molecular weight and molecular weight distribution of the polymer; and forming an aqueous solution of the partially hydrolyzed polyacrylamide in a concentration to enable the partially hydrolyzed polyacrylamide to be injected into the oil-bearing formation.

4,687,587

METAL FORMING LUBRICANT

Alan R. Daglish, Dunstable; Mark H. Foster, Banbury, and William F. Marwick, Byfield, all of United Kingdom, assignors to Alcan International Limited, Montreal, Canada

Filed Jan. 22, 1986, Ser. No. 821,499

Claims priority, application United Kingdom, Jan. 29, 1985, 8502148

Int. Cl.[4] C10M *129/68*

U.S. Cl. 252—11 **15 Claims**

1. A metal-forming method comprising applying a lubricant to the surface of a metal workpiece and thereafter deforming the workpiece, characterized in that the lubricant comprises discrete particles of a waxy material having a softening point above the metal-forming temperature in a solid or viscous liquid monomeric organic carrier, the discrete particles having diameters in the range of 1 to 100 microns and the weight ratio of discrete particles to monomeric carrier being from 1:10 to 10:1, and the waxy material being selected from the group consisting of esters of high molecular weight monohydric alcohols with fatty acids, paraffin waxes including microcrystalline waxes, low molecular weight polyethylene, and amide waxes.

4,687,588

REFRIGERANT MIXTURE OF TRICHLOROFLUOROMETHANE AND DICHLOROHEXAFLUOROPROPANE

Mark O. McLinden, Gaithersburg; David A. Didion, Cheverly, both of Md., and Calvin D. MacCracken, Englewood, N.J., assignors to Calmac Manufacturing Corporation, Englewood, N.J.

Filed Aug. 5, 1986, Ser. No. 893,380

Int. Cl.[4] C09K *5/04*

U.S. Cl. 252—67 **8 Claims**

5. A method of achieving a higher lift in a centrifugal-type

compressor which comprises evaporating a mixture consisting essentially of trichlorofluoromethane (R-11) and dichlorohexafluoropropane (R-216) and which mixture has a higher saturated vapor density than that of pure R-11.

4,687,589

ELECTRONHEOLOGICAL FLUIDS

Hermann Block, 112 Station Road, Cogenhoe, Northampton NN7 1LU, and Jeffrey P. Kelly, 66 Honey Hill Road, Queens Park, Bedford MK40 4NW, both of England

Filed Jan. 27, 1986, Ser. No. 822,320

Claims priority, application United Kingdom, Feb. 6, 1985, 8503010; Feb. 12, 1985, 8503581

Int. Cl.[4] C10M *169/04*

U.S. Cl. 252—73 **14 Claims**

1. An electrorheological fluid which comprises a liquid continuous phase and, dispersed therein, at least one dispersed phase and which is capable of functioning as such when at least the dispersed phase is substantially anhydrous.

4,687,590

OIL-IN-ALCOHOL MICROEMULSION CONTAINING OIL-SOLUBLE CORROSION INHIBITOR IN ANTIFREEZE

John L. Haack, Tarrytown, N.Y., assignor to First Brands Corporation, Danbury, Conn.

Filed Nov. 1, 1985, Ser. No. 793,847

Int. Cl.[4] C09K *5/00*

U.S. Cl. 252—75 **28 Claims**

1. An oil-in-alcohol microemulsion-containing antifreeze composition concentrate having a discontinuous phase and a continuous phase comprising:

(a) at least one alcohol in an amount sufficient to form a continuous phase in the concentrate;

(b) alcohol-insoluble oil particules forming a discontinuous phase in said composition, said particles having a particle size less than about 0.1 micron;

(c) at least one hydrophobizing compound selected from the group consisting of organic derivatives of the following: phosphate, sulfate, phosphonate, sulfonate, carboxylate, ammonium and phosphonium salts, amine oxides, phosphine oxides, amphoteric and zwitterionic groups, succinates, and mixtures thereof wherein the organic group is selected from the class consisting of the following radicals: alkyl, alkenyl, alkynyl, aryl, alkrayl and arylalkyl all having up to 24 carbon atoms, alkyleneoxy, polyalkyleneoxy, and combinations thereof;

(d) at least one emulsifier present in an amount of from zero up to an amount sufficient to stabilize the microemulsion in the composition; and

(e) at least one oil-soluble corrosion inhibitor, in a corrosion-inhibiting effective amount, said oil-soluble corrosion inhibitor being selected from the group consisting of azole compounds, phenol compounds, imidazoline compounds, succinic acid esters and partial esters, amino acid derivatives, glycerol ethers, benzimidazoles, oxazolium hydroxides, acyl glycine oxazolines, N-subsituted hydropyrimidine derivatives, amino-triazole derivatives, hydrocarbyl alkoxy amino alkylene-substituted asparagines, poly(oxyalkylated) hydrazine thiourea derivatives, nitro compounds, nitrogen and sulfur heterocylic compounds, sulfur-bridged hydrocarbon ring compounds casein sulfonate, organic acid salts of carboxylate-containing compounds, aminosuccinate derivatives and petroleum oxidates, and mixtures thereof.

4,687,591

CLEANING COMPOSITION FOR CYMBALS

Antonio Castaldo, 1170 Klockner Rd., Trenton, N.J. 08619

Filed Aug. 22, 1986, Ser. No. 899,202

Int. Cl.[4] C11D *1/24, 3/14*

U.S. Cl. 252—90 **1 Claim**

1. A liquid composition for cleaning and polishing cymbals comprised by weight of:

(a) between 15 and 25 percent of a finely divided kaolin clay,

(b) between 4 and 8 percent of thioglycolic acid or its ammonium salt,

(c) between 1 and 3 percent of a disulfonated alkyl aryl ether surfactant having electrolyte tolerance,

(d) a minimum effective quantity of a colloidal foam suppressing substance, and

(e) the balance being water,

said composition having a pH in the range of 6.5 to 7.5, and being confined along with a gaseous propellant substance within an aerosol can equipped with a spray nozzle.

4,687,592

DETERGENCY BUILDER SYSTEM

Jerome H. Collins, Cincinnati; Larry N. Mackey, Fairfield, and Gianfranco L. Spadini, Wyoming, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 702,521, Feb. 19, 1985, abandoned. This application Jul. 11, 1985, Ser. No. 754,561

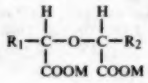
Int. Cl.[4] C11D *3/20*

U.S. Cl. 252—99 **14 Claims**

1. A detergent composition comprising:

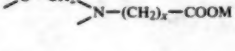
(a) from about 2% to about 30% by weight of a surfactant selected from the group consisting of anionic, nonionic, zwitterionic, ampholytic and cationic surfactants and mixtures thereof;

(b) from about 15% to about 40% of an ether polycarboxylate compound or mixtures thereof of the structure:

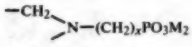


wherein R_1 and R_2 are each independently H, COOM or CH_2COOM and wherein R_1 and R_2 are not both H and wherein M is hydrogen, an alkali metal, ammonium or substituted ammonium and said compound has a log K_{Ca} (35° C., 0.1M ionic strength, pH 9.5) of at least about 3.6;

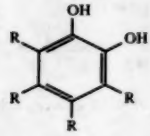
(c) from about 0.75% to about 3% by weight of an iron and manganese chelating agent selected from the group consisting of: 1) amino carboxylates having one or more units of the substructure:



wherein M is hydrogen, an alkali metal, ammonium or substituted ammonium, and x is from 1 to about 3, (2) amino phosphonates having one or more units of the substructure:



wherein M is hydrogen, an alkali metal, ammonium or substituted ammonium and x is from 1 to about 3, 3) polyfunctionally-substituted aromatic chelating agents consisting of compounds having the formula:



wherein at least one R is —SO_3H, or —COOH or soluble salts thereof and mixtures thereof and 4) mixtures thereof;

(d) from about 0.75% to about 3% by weight of one or more polymeric polycarboxylic acid dispersing agents, copolymers thereof and salts thereof containing at least about 60% by weight of segments with the general formula:

wherein X, Y and Z are each selected from the group consisting of hydrogen, methyl, and carboxy; M is hydrogen, alkali metal, ammonium or substituted ammonium and n is from about 30 to about 400; and

(e) from 0% to about 75% by weight of an inorganic detergency builder selected from the group consisting of alkali metal phosphates, sodium carbonate, sodium silicate, sodium aluminosilicate and mixtures thereof.

4,687,593

ALKYLARYL SULFONATE COMPOSITIONS

Michael J. Dolan, Town and Country; John N. Rapko, St. Louis, and William W. Morgenthaler, Maryland Heights, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 682,130, Dec. 17, 1984, Pat. No. 4,645,623. This application Sep. 18, 1986, Ser. No. 908,855

Int. Cl.[4] C09K *3/00*

U.S. Cl. 252—182 **7 Claims**

1. A detergent intermediate suitable for sulfonation and neutralization comprising from about 85% to 95% by weight low 2-phenyl alkylbenzene and about 5% to about 15% by weight of an alkylated diphenyl oxide.

4,687,594

EMULSIFIERS USEFUL IN THE MANUFACTURE OF HIGH SOLIDS EMULSION POLYMERS

Dennis E. Lietz, Deerfield, and Carleen C. Whittern, Lindenhurst, both of Ill., assignors to Stepan Company, Northfield, Ill.

Filed May 10, 1985, Ser. No. 733,282

Int. Cl.[4] B01F *17/02;* **C11D** *1/12*

U.S. Cl. 252—352 **4 Claims**

1. A surfactant comprising

(a) about 37% by weight of nonyl phenol tetra ethoxylate, and

(b) about 53% by weight of a sulfate salt of nonyl phenol tetra ethoxylate produced as the reaction product of nonyl phenol tetra ethoxylate and a sulfating agent, forming a nonyl phenol tetra ethoxylate sulfuric acid, said acid is then neutralized with a neutralizing base selected from the group consisting of alkali metal hydroxides, ammonium hydroxides and amines, and

(c) about 10% by weight of the sulfate salt of said neutralizing base, said surfactant being useful in the preparation of high solids emulsion polymers.

4,687,595

PROCESS FOR PRODUCING CORROSION INHIBITING PARTICLES

Roger J. Howes, Camberley, and David G. Othen, Bracknell, both of England, assignors to The British Petroleum Company, p.l.c., London, England

Filed May 29, 1985, Ser. No. 739,022

Claims priority, application United Kingdom, Jun. 2, 1984, 8414125

Int. Cl.[4] C09D *5/08;* **C09K** *15/02;* **C23F** *11/18;* **C08K** *9/00*

U.S. Cl. 252—387 **10 Claims**

1. A process for producing corrosion inhibiting particles comprising binding corrosion inhibiting cations by ion-exchange to particles of silica or alumina to form cation exchanged particles, the cations of which are releaseable by further ion-exchange characterised in that the BET surface area of the cation-exchanged particles is reduced by subjecting the cation-exchanged particles to a heat treatment which comprises heating the particles at a temperature of from 50° to 120° C. while maintaining the water content of the particles at more than 15% by weight, followed by heating with removal of water to dry the particles.

4,687,596

LOW VISCOSITY, ELECTRICALLY CONDUCTIVE FERROFLUID COMPOSITION AND METHOD OF MAKING AND USING SAME

Lucian Borduz, Milford, and Kuldip Raj, Merrimack, both of N.H., assignors to Ferrofluidics Corporation, Nashua, N.H.

Continuation-in-part of Ser. No. 713,757, Mar. 19, 1985, Pat. No. 4,604,229, and a continuation-in-part of Ser. No. 736,388, May 21, 1985, Pat. No. 4,604,222, and a continuation-in-part of Ser. No. 773,627, Sep. 9, 1985. This application Jun. 19, 1986, Ser. No. 875,985

Int. Cl.[4] H01B *1/06*

U.S. Cl. 252—510 **23 Claims**

1. In an electrically conductive ferrofluid composition, which composition comprises:

(a) a polar liquid carrier;

(b) finely divided magnetic particles dispersed in the polar liquid carrier and in an amount to provide magnetic properties to the ferrofluid composition;

(c) a surfactant to disperse and stabilize the magnetic particles in the polar liquid carrier, the improvement of which comprises:

(i) a polar-ionizing or dissociation agent which agent is miscible with the polar liquid carrier and which agent comprises an oxygen-containing agent selected from a group consisting of an alkylene polyol, an ether of an alkylene polyol or combinations thereof, the agent present in an amount sufficient to ionize or dissociate the surfactant and to provide a ferrofluid composition having an electrical resistivity of less than about 1×10^7 ohms-centimeters.

22. In an electrically conductive ferrofluid composition, which composition comprises:

(a) a polar liquid carrier;

(b) finely divided ferromagnetic particles dispersed in the polar liquid carrier and in an amount to provide magnetic properties to the ferrofluid composition; and

(c) a surfactant to disperse and stabilize the ferromagnetic particles in the polar liquid carrier, the improvement which comprises:

(i) wherein the surfactant comprises a first coating layer of a first anionic surfactant in an amount of from about 5 to 10 percent by volume of the composition and a second coating layer of a second cationic surfactant in an amount of from about 2 to 12 percent by volume of the composition; and

(ii) carbon particles dispersed in the composition in an amount of up to about 5 percent by weight of the composition; and

(iii) an ionizing or dissociating agent in an amount of from

about 3 to 20 percent by volume of the composition, the agent selected from the group consisting of: diethyl glycol dibutyl ether; tetraethylene glycol dimethyl ether; triethylene glycol dimethyl ether; diethylene glycol diethyl ether; diethylene glycol dimethyl ether; ethylene glycol diethyl ether; polyethylene glycol and polypropylene glycol.

4,687,597

COPPER CONDUCTOR COMPOSITIONS

Vincent P. Siuta, Cherry Hill, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 29, 1986, Ser. No. 823,657

Int. Cl.[4] H01B *1/02*

U.S. Cl. 252—512 **8 Claims**

1. A composition suitable for use in fritless conductor overprint applications which is an admixture of finely divided particles consisting essentially of

(a) 10–50% wt. copper metal, all particles of which are less than 2 μm in largest dimension, less than 10% are less than 0.5 μm in largest dimension, have an average particle size of 0.7–1.2 μm and average surface area of less than 2 m^2/g;

(b) 90–50% wt. finely divided copper metal particles, substantially all of which are 1–10 μm in largest dimension and have an average particle size of at least 1.5 μm;

(c) 0.2–2% wt. of less than 10 μm particles of a reducible heavy metal oxide selected from the group consisting of oxides of lead, bismuth, cadmium, cobalt, nickel and mixtures and precursors thereof;

(d) 0–1.0% wt. of less than 5 μm particles of a refractory metal selected from the group consisting of tungsten, molyhadenum, thenium and mixtures and alloys thereof: and

(e) 0–5.0% wt. of a noble metal selected from the group consisting of palladium, platinum, ruthenium, irridium, rhodium and mixtures thereof having a surface area of 2–10 m^2/g.

4,687,598

ELECTRODE-ACTIVE MATERIAL FOR ELECTROCHEMICAL BATTERIES AND METHOD OF PREPARATION

Ravi Varma, Hinsdale, Ill., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Continuation of Ser. No. 549,382, Nov. 7, 1983, abandoned. This application Jun. 17, 1986, Ser. No. 876,649

Int. Cl.[4] H01B *1/06*

U.S. Cl. 252—518 **11 Claims**

11. A method of preparing a battery electrode comprising providing an electrode-active material selected from chalogen-containing compounds of Ni, Fe, Pb, Co, Cu and mixtures thereof for a positive electrode and selected from the group consisting of Li, Na, K, Ca, Mg, Mn, Zn, Cd, Cu, Si, Al, Pb and alloys thereof for the negative electrode, mixing a ligand in the form of an electrically conductive polymer with the electrode-active material wherein the polymer is present in the range of from about 2% by weight to about 5% by weight of said electrode-active material, to provide metal ion or negative ion vacancies in the range of from about 0.05 to about 0.1 atom percent, said ligands for a positive electrode being selected from the class consisting of polyacetylene polymers having molecular weights in excess of 10,000 and cyclic polyamide with 3–5 functional groups and wherein said ligands for a negative electrode being selected from the class consisting of tertiary butyl cyclohexyl-15-crown-5, TTF-TCNQ, and polymers of polyethylene oxide and one or more of $LiCF_3SO_3$, LiBr, Na_2S, and NaCN, mixing a binder with the electrode-active material and polymer, and forming the mixed electrode-active material and polymer and binder into a battery electrode.

4,687,599

PERFUME COMPOSITIONS AND PERFUMED PRODUCTS WHICH CONTAIN ONE OR MORE 4,7-ALKADIENALS AS THE ESSENTIAL SUBSTANCE

Franciscus P. Van Lier; Leendert M. van der Linde, and Antonius J. A. van der Weerdt, all of Huizen, Netherlands, assignors to Naarden International N.V., Naarden-Bussem, Netherlands

Filed Aug. 20, 1985, Ser. No. 767,490

Claims priority, application Netherlands, Aug. 23, 1984, 8402579

Int. Cl.[4] A61K *7/46*

U.S. Cl. 512—27 **11 Claims**

1. A perfume composition comprising an effective odorant amount of at least one alkadienal selected from the group consisting of cis,cis-4,7-decadienal, cis,cis-4,7,9-decatrienal and cis,cis-4,7,12-tridecatrienal.

4,687,600

PROCESS FOR THE SEPARATION OF COATED NUCLEAR FUEL PARTICLES FROM A GRAPHITIC MATRIX AND INSTALLATION FOR IMPLEMENTING THE PROCESS

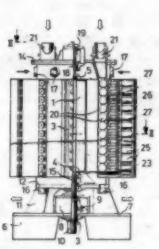
Hartmut Kronschnabel, Aachen; Wilhelm Goerings, Jülich; Johann Bölingen, Aachen, and Gerd Kleine-Vennekate, Haan/Gruiten, all of Fed. Rep. of Germany, assignors to Kernforschungsanlage Jülich GmbH, Jülich, Fed. Rep. of Germany

Division of Ser. No. 343,703, Jan. 28, 1982, Pat. No. 4,502,642. This application Jan. 3, 1985, Ser. No. 688,627

Claims priority, application Fed. Rep. of Germany, Feb. 5, 1981, 3103900

Int. Cl.[4] G21C *19/44, 19/48;* B02C *19/12*

U.S. Cl. 252—627 **7 Claims**



1. Treating process for the separation of coated nuclear fuel particles from a graphitic matrix in which the nuclear fuel particles are embedded; comprising removing the graphite encasing the nuclear fuel particles through comminuting of said graphite by a brush, said brush and said graphite being moved towards each other at a pressure so as to comminute said graphite while concurrently isolating the nuclear fuel particles with their coating or the nuclear fuel particles themselves in an undestroyed, intact condition; and separating the nuclear fuel particles contained in the brushed material from the comminuted graphite.

4,687,601

PROCESS FOR THE PREPARATION OF PULVERULENT METALLIC OXIDES FROM METALLIC NITRATES

Roland Bachelard, and Philippe Joubert, both of Lyons, France, assignors to Comurhex, France

Filed Nov. 21, 1984, Ser. No. 674,174

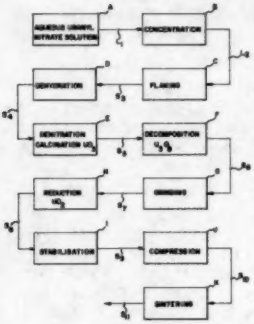
Claims priority, application France, Nov. 25, 1983, 83 19173

Int. Cl.[4] C01G *43/01, 43/025;* C09K *11/04;* G21G *4/00*

U.S. Cl. 252—638 **15 Claims**

1. A process for the preparation of pulverulent metallic oxides having a selected specific surface area by thermal deni-

tration of metallic nitrates selected from the group consisting of hydrated uranyl nitrate and hydrated uranyl nitrate in admixture with at least one other nitrate selected from the group consisting of thorium, cerium and plutonium comprising a first step of heating said metallic nitrates to a temperature between 160° and 300° C. to at least partially dehydrate said dehydrated



uranyl nitrate and a second step of calcining the product resulting from said first step by heating the product at a temperature between 260° and 600° C., while subjecting the product to steam pressure, said steam pressure being at most equal to one bar with the amount of steam pressure being selected depending upon the desired specific surface area of the pulverulent metallic oxide(s).

4,687,602

NOVEL 2-SUBSTITUTED 3-SULFOPROPYL-AMMONIUM BETAINES AND PROCESSES FOR MAKING SAME

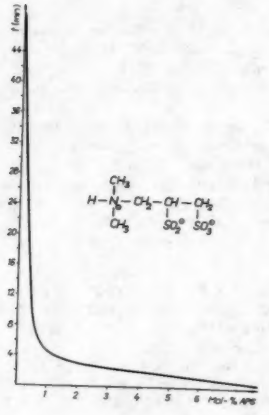
Detlef Ballschuh; Horst Seibt; Jochen Rusche, and Roland Ohme, all of Berlin, German Democratic Rep., assignors to Akademie der Wissenschaften der DDR, Berlin, German Democratic Rep.

Filed Jun. 24, 1985, Ser. No. 748,155

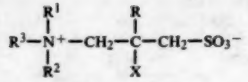
Claims priority, application German Democratic Rep., Jun. 1, 1984, 263723; Jun. 1, 1984, 263718

Int. Cl.[4] C07C *143/14*

U.S. Cl. 260—501.12 **1 Claim**



1. 2-substituted 3-sulfo propyl-ammonium betaine of formula I,



I

wherein:

(a) SO_2M or

(b) SO_3M, whereby M is selected from the group consisting of H, Na, K and NH_4,

(B) R is

(a) hydrogen or

(b) methyl,

(C) R^1 and R^2 independent from each other are

(a) hydrogen,

(b) alkyl with 1 to 3 C-atoms,

(c) 2-hydroxyethyl or

(d) oxyethylene residues with up to 10 ethylene oxide units, and

(D) R_3 is

(a) hydrogen or

(b) alkyl with 1 to 22 C-atoms, whereby —NH—CO— or —CO—NH— may be contained in the chain.

4,687,603

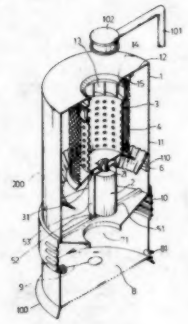
COOLING TOWER

Wen H. Liu, No. 139, Chung Hua Road, Miao Li City, Taiwan

Filed Mar. 3, 1986, Ser. No. 835,528

Int. Cl.[4] B01F *3/04*

U.S. Cl. 261—24 **1 Claim**



1. a cooling tower comprising:

an outer structure composed of a side wall and a top cover, said top cover having an opening on its center with a deflection device for reducing re-circulation of air within the housing

a motor which is fixed in a motor seat and whose shaft forms a spindle which rotates a rotatable cylinder;

a rotatable cylinder having sides which have a plurality of small apertures, a centrifugal fan being an integral part of the rotating cylinder, the bottom portion of said cylinder engaging said shaft of said motor, said centrifugal fan comprising:

a first flange on the top portion,

a second flange on the portion with apertures,

a plurality of blades which are equally spaced and fixed between said first and second flanges;

a screen positioned concentrically around said rotatable cylinder and secured onto the inside of the top cover of the outer structure, said screen comprising a net and a frame, said frame further comprising a flange and skirt, said frame being secured onto the inside of the top cover of the outer structure with said flange, said skirt extending

upwards and inwards through the bottom portion of said rotatable cylinder, said net adherent to said frame;

an annular water guiding plate which is corrugated and which slants downwards between the skirt of the screen and the beams of the bracket from the side wall of said outer structure;

an annular water collecting plate which also slants downwards from the side wall of the outer structure;

a louver disposed under the outer structure to allow for ventilation,

a water tank under the louver which receives the cooled water falling therein;

a floating valve extending from the wall of said water tank which controls the amount of water within said water tank;

an outlet which is disposed on said water tank which allows water to flow out;

a base which supports the whole structure; and

a sprayer head being positioned above the opening of the top cover of the outer structure which seperates the high temperature water into small droplets.

4,687,604

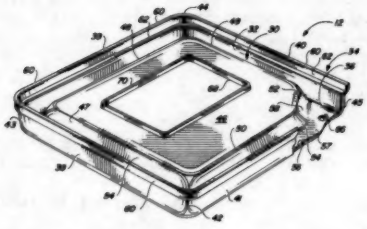
FLOOR PAN FOR EVAPORATIVE COOLERS

Adam D. Goettl, 4960 E. Palomino Rd., Phoenix, Ariz. 85018

Continuation of Ser. No. 776,854, Sep. 17, 1985, abandoned. This application Feb. 18, 1987, Ser. No. 16,492

Int. Cl.[4] B01D *47/00;* **F02M** *69/02*

U.S. Cl. 261—29 **15 Claims**



1. A floor pan for use in the bottom end of an evaporative cooler cabinet for containing the operational water supply of the evaporative cooler, said floor pan comprising:

(a) a platform (means) defining a planar upper surface:

(b) an endless upstanding sidewall in spaced surrounding relationship with respect to said platform , said sidewall defining an upper edge;

(c) an upwardly open endless trough between said platform and said upstanding sidewall for containment of the operating water supply of the evaporative cooler; and

(d) said platform having its upper planar surface elevated relative to the bottom of said trough so as to be approximately level with the upper edge of said sidewall with the upper planar surface of said platform having a surface area which is greater than half of the total area of said floor pan for minimizing the quantity of the operating water supply containable in said trough.

4,687,605

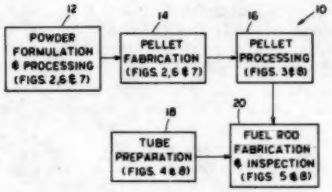
MANUFACTURING AUTOMATION SYSTEM FOR NUCLEAR FUEL ROD PRODUCTION

Francis Cellier, Export, Pa.; Robert T. Grauly, Columbia, S.C.; Wendell L. Johnson, Dentsville, S.C.; David M. Batson, Lexington, S.C.; John C. Limpert, Export, Pa.; Christopher K. C. Wu, Columbia, S.C.; George D. Bucher, Allison Park, Pa.; Clarence D. John, Jr., Penn Hills, Pa.; John E. Steinkirchner, Penn Hills, Pa.; Paula J. Larouere, North Versailles, Pa.; Hemant H. Shah, Monroeville, Pa., and Robert A. Williams, Columbia, S.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 19, 1985, Ser. No. 702,520

Int. Cl.[4] G21C *21/00, 3/62;* **C01G** *43/02, 43/06*

U.S. Cl. 264—0.5 **6 Claims**



1. In an automated system of nuclear fuel rod production, the combination comprising:

(a) a powder formulation and processing stage including

(i) a plurality of vaporization units for supplying a radioactive material in the form of a gas,

(ii) a plurality of kiln units connected in flow communication with said vaporization units for receiving said gas from said vaporization units and converting said radioactive material from the form of said gas to the form of a powder, said plurality of kiln units being less in number than said plurality of vaporization units, one of said kiln units being connected with a pair of said vaporization units,

(iii) a plurality of check hopper units being connected in flow communication with said kiln units for receiving said powder from said kiln units, for holding said powder for sampling and inspection and for dispensing said powder therefrom, said plurality of check hopper units being greater in number than said plurality of kiln units, a pair of said check hopper units being connected with one of said kiln units such that as at least one of said check hopper units of said pairs thereof is being filled from its respective one kiln unit, at least another of said check hopper units of said pairs thereof is dispensing its powder while the powder in at least still another of said check hopper units of said pairs thereof is being sampled whereby powder can be continuously dispensing from at least one of said check hopper units while in-line sampling of said powder is being carried out, each of said check hopper units being of a predetermined capacity less than geometric control of the radioactive material;

(iv) a plurality of blending units connected in flow communication with said check hopper units for receiving said powder from said check hopper units and for blending said powder into a radioactive composition suitable for use as nuclear reactor fuel, said plurality of blending units being fewer in number than said check hopper units and greater in number than said plurality of kiln units, said blending units each having a capacity which exceeds geometric control of the radioactive material but which maintains said material under moderation control, and

(v) valve means for causing the filling of one of said plurality of blending units at a time with powder from said check hopper units such that as one of said blending

units is being filled, another of said blending units is being analyzed and yet another of said blending units is being dispensed whereby blended powder can be dispensed continuously from said blending units;

(b) a pellet fabrication stage including

(i) a plurality of pellet fabricating units connected in flow communication with said blending units for receiving said blended powder from said one of said blending units which happens to be dispensing at any given time, said pellet fabricating units being operable to press said powder into slugs, then granulate said slugs, next mix said granulated powder with lubricant and finally form said mixture into a succession of green pellets of said radioactive composition, said fabricating units being fewer in number than said blending units but capable of providing a continuous stream of said green pellets; and

(c) a pellet processing stage including

(i) a multiplicity of sintering boats,

(ii) means for conveying said sintering boats and for providing surge storage thereof,

(iii) means for loading green pellets from said pellet fabricating units into said sintering boats on said conveying means, and

(iv) a plurality of sintering furnaces arranged with said conveying means such that each of said loaded boats is directed to an infeed end of one of said furnaces, is moved through said one furnace for sintering the pellets loaded therein and is directed from a discharge end of said one furnace at the completion of sintering, said sintering furnaces being greater in number than said green pellet fabricating units.

4,687,606

METALLOID PRECURSOR POWDER AND METHOD OF MAKING SAME

Gary M. Crosbie, Dearborn, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Oct. 15, 1984, Ser. No. 660,759

Int. Cl.[4] B22D *23/08*

U.S. Cl. 264—8 8 Claims

2. A method of making a metalloid precursor powder with improved chemical uniformity useful in the making of ceramics with greater physical reliability and lower cost, by the steps of:

(a) dissolving second phase forming additive metals into a molten body of a selected metalloid to form a solution, said additive metals comprising 2–15% by weight yttrium and up to 1.3% by weight aluminum;

(b) comminuting the solution into particles having a particle size distribution of 2–50 microns and rapidly solidifying the particles at a rate effective to distribute the additive metals and impurity localizations thereof substantially uniformly throughout the particles with spacing betwene said localizations being substantially in the range of 1–25 microns; and

(c) oxidizing the additive metals in said particles.

4,687,607

PROCESS FOR PRODUCING ELECTRODE SUBSTRATE FOR USE IN FUEL CELLS

Masatomo Shigeta, Iwaki; Kuniyuki Saitoh, Abiko, and Hiroyuki Fukuda, Iwaki, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 535,299, Sep. 23, 1983, abandoned. This application Mar. 15, 1985, Ser. No. 712,163

Claims priority, application Japan, Oct. 1, 1982, 57-172994; Mar. 16, 1984, 59-52026

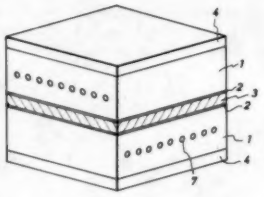
Int. Cl.[4] C01B *31/02;* C04B *38/06;* D01F *9/12;* C08J *9/26*

U.S. Cl. 264—29.5 12 Claims

1. A process for producing a porous carbonaceous electrode substrate provided with a group of elongated holes for reactant gases for fuel cells comprising the steps of (a) introducing into a metal mold of predetermined shape and dimension, in order,

(1) a first amount of a first material for producing said porous carbonaceous electrode substrate comprising 10 to 50% by weight of a filling material which is short carbon fibers or granular activated carbon, 20 to 40% by weight of a binding material which is selected from the group consisting of phenol resin, epoxy resin, furfuryl alcohol resin, pitch derived from petroleum or coal and mixtures thereof and shows a carbonization yeild of 30 to 75% by weight, and 20 to 50% by weight of a micropore-regulating material which is selected from the group consisting of polyvinylalcohol, polyvinylchloride, polystyrene, polyethylene, polypropylene, sucrose and mixtures thereof,

(2) a high polymeric substance in the shape of a cloth-like fabric or a grating-like molding for forming the elongated holes, which substance is selected from the group consisting of polyethylene, polypropylene, polystyrene, polyvinylalcohol and polyvinylchloride and gives a carbonization yield of lower than 30% by weight and



(3) a second amount of said first material for producing said porous carbonaceous electrode substrate, (b) press-molding the thus provided materials in the metal mold heated to from 70° to 170° C. under a molding pressure of from 5 to 100 kg/cm^2 for from 1 to 160 min, (c) subjecting the thus press-molded material to after-hardening, and (d) then further calcinating the thus after-hardened material in an inert atmosphere at a temperature from 800° to 3,000° C. to thermal-decompose a larger part of said high polymeric substance to be carbonized, thereby forming said porous carbonaceous electrode substrate provided with said group of elongated holes opening from one side to the opposite side of the electrode substrate through nearly the central region of the thickness of the substrate.

4,687,608

COMPOSITE PERMANENT MAGNET FOR MAGNETIC EXCITATION AND METHOD OF PRODUCING THE SAME

Muneyoshi Eino, Kumagaya, Japan, assignor to Hitachi Metals, Ltd., Tokyo, Japan

PCT No. PCT/JP82/00265, § 371 Date Mar. 10, 1983, § 102(e) Date Mar. 10, 1983, PCT Pub. No. WO83/00264, PCT Pub. Date Jan. 20, 1983

Continuation of Ser. No. 476,871, Mar. 10, 1983, abandoned. This PCT application Jul. 14, 1982, Ser. No. 743,274

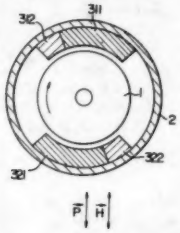
Claims priority, application Japan, Jul. 14, 1981, 56-109673; Dec. 5, 1981, 56-196206; Dec. 24, 1981, 56-212241; Dec. 24, 1981, 56-212242; Feb. 26, 1982, 57-30149; May 10, 1982, 57-76673

Int. Cl.[4] C04B *41/81;* H01F *1/08*

U.S. Cl. 264—62 6 Claims

1. A method of producing a composite permanent magnet for magnetic excitation comprising a first material and a second material both of which have the same basic composition integrally formed into one body, said first material having a higher residual magnetic flux density Br as compared to the second material, and said second material having a higher coercive force $_JHc$ as compared to the first material wherein oxide powder mainly containing $Mo.nFe_2O_3$ (where M is an

element selected from the group consisting of Ba, Sr, Pb and Ca or a mixture thereof, and n is a number of 5 to 6) is compacted, then a part of the resultant compacted body is impregnated with a liquid containing one kind or more cations or electropositive atoms of metallic or semimetallic elements, or



one or more molecular cations or electropositive molecules containing one or more metallic or semimetallic elements, or a mixture thereof, and the body being fired so that the coercive force $_JHC$ of the part impregnated with said liquid become higher than that of the non-impregnated part because of a substance contained in said liquid.

4,687,609

METHOD FOR CASTING POLYESTER ON GLASS MOLD

Arthur Strugatz, 256 Asharoken Ave., Northport, N.Y. 11768

Filed Apr. 14, 1986, Ser. No. 851,781
Int. Cl.[4] B29C *33/38, 33/42, 39/12*
U.S. Cl. 264—132 **6 Claims**

1. A method for casting polyester on a glass mold to create artwork which comprises:

(a) preparing a glass mold wherein a piece of glass is covered in its entirety with one-sided tape;

(b) transferring a line drawing or design from paper to the tape;

(c) removing the tape only in the area where the line drawing or design appears on the tape such that the underlying glass becomes exposed;

(d) blasting the glass mold so prepared such that a channel or gulley forms where the glass is exposed; and

(e) casting polyester containing an appropriate pigment on the glass mold so prepared such that an integral raised beaded structure depicting the line drawing or design is formed on the cast polyester in the precise configuration of the channel or gulley formed in the glass mold and the polyester so cast has a smooth polished surface.

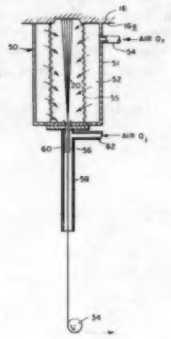
4,687,610

LOW CRYSTALLINITY POLYESTER YARN PRODUCED AT ULTRA HIGH SPINNING SPEEDS

George Vassilatos, Wilmington, Del., assignor to E. I. Du Pont de Neumours and Company, Wilmington, Del.

Filed Apr. 30, 1986, Ser. No. 857,279
Int. Cl.[4] B28B *3/20*
U.S. Cl. 264—211.14 **2 Claims**

1. A continuous filament polyester yarn melt spun in a path from a spinning pack at a spinning speed of at least 5 km/min controlled by a withdrawal means by directing a gas into a zone enclosing said path, said zone extending from said spinning pack to a location between the spinning pack and the withdrawal means maintaining said zone under superatmospheric pressure of less than 1 kg/cm^2 and increasing the velocity of the gas as it leaves the zone to a level greater than the velocity of the filaments, said yarn having a density in the range of from about 1.348 to about 1.370 grams per ml, having



an elongation break in the range of from 30% to 120% and having a boil-off-shrinkage which is at least 10%.

4,687,611

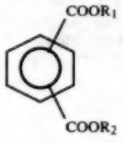
PROCESS FOR DRYING POLYIMIDE FILM

Cyrus E. Sroog, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 23, 1985, Ser. No. 812,718
Int. Cl.[4] B29C *39/14;* **B29D** *7/00, 7/01*
U.S. Cl. 264—236 **13 Claims**

1. In a process for casting a polyimide film from solution of precursor polyamic acid in an organic solvent,

the improvement comprising adding to said polyamic acid solution about 0.5-5.0% based on the weight of dissolved polyamic acid of a phthalic ester,



wherein each one of R_1 and R_2 independently is an alkyl of 1 to 8 carbon atoms,

casting the solution on a suitable flat substrate, and heating the substrate containing a layer of the solution thereon to a temperature of about 100° to 200° C. to remove a major portion of the organic solvent and to effect a partial conversion to polyimide, and then removing the resulting partially converted film from the substrate and further heating it, under restraint, to about 200° to 375° C. for a sufficient time to effect complete conversion to polyimide and virtually complete removal of the organic solvent.

4,687,612
HEAT TREATING THERMOPLASTIC SHEET MATERIALS FOR THERMO-FORMING

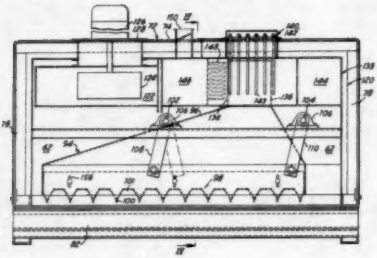
John Clarke, Faringdon; Roderick M. D'Eath, and Derek E. Haycock, both of Wantage, all of England, assignors to Metal Box Public Limited Company, Berkshire, England

Filed Jun. 20, 1986, Ser. No. 876,693

Claims priority, application United Kingdom, Jun. 21, 1985, 8515827

Int. Cl.[4] B29C *17/03*

U.S. Cl. 264—322 **46 Claims**



1. An apparatus for heating thermoplastic sheet materials comprising:

an enclosure having an inlet opening and an outlet opening at opposite ends of said enclosure, wherein the thermoplastic sheet material enters and leaves said enclosure through the inlet opening and the outlet opening, respectively;

a support means within said enclosure on which the thermoplastic sheet material rests;

a hot gas delivery means within said enclosure for directing hot gas from a source thereof toward the thermoplastic sheet material resting on said support means; and

a first drive means for reciprocally moving said hot gas delivery means within said enclosure along a path toward and away from the inlet and outlet openings, whereby the reciprocal movement of said gas delivery means enables hot gas to contact a substantial portion of the thermoplastic sheet material within said enclosure.

4,687,613
INJECTION MOLDING PROCESS FOR SYNTHETIC RESIN AND ITS APPARATUS

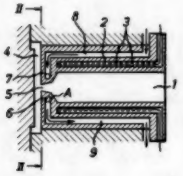
Shigeru Tsutsumi, 1165 Toyama-machi; Yonezawa-shi, Yamagata-ken, Japan

Continuation of Ser. No. 437,106, Oct. 27, 1982, abandoned. This application Jun. 24, 1985, Ser. No. 747,695

Claims priority, application Japan, Oct. 30, 1981, 56-172773

Int. Cl.[4] B29C *45/20, 45/72*

U.S. Cl. 264—328.15 **2 Claims**



1. A process for injection molding a fused synthetic resin into a cavity comprising the steps of:

heatng and fusing a synthetic resin from a runner and a gate, said runner and said gate communicating with each other;

injecting fused synthetic resin from said runner and gate into a cavity which communicates with said gate;

supplying a cooling medium as close to the external periphery of said gate as feasible by forcing said cooling medium into an annular channel directly adjacent to and surrounding said gate in a mold part which comprises said gate, instantaneously cooling and solidifying the fused synthetic resin within the gate to close the gate after the resin has been injected into the cavity; and

stopping the supply of cooling medium to said channel at the completion of an injection molding cycle and opening the gate by letting said runner heat and fuse the solidified resin, so that a new cycle can be started.

2. An injection molding apparatus for synthetic resin comprising:

a pair of molds defining a mold cavity;

a gate communicating with the cavity;

a runner communicating with said gate;

heater means for continuously heating and fusing synthetic resin in the gate and the runner;

a mold part comprising said gate;

cooling means associated with said mold part comprising a coolant channel therein directly adjacent said gate for locally cooling said gate to a temperature sufficient to solidify synthetic resin in the gate; and

means for actuating said cooling means every time an injection molding operation is carried out to close the gate by cooling and solidifying synthetic resin therein.

4,687,614
PROCESS FOR PRODUCING A HIGH INTEGRITY CONTAINER

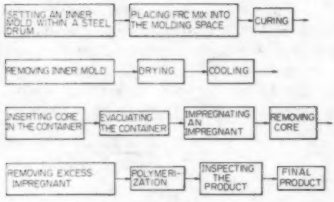
Osamu Suzuki; Kanjiro Ishizaki, both of Saitama, and Seiichi Ozawa, deceased, late of Tokyo, all of Japan (by Yoshiko Ozawa, heiress), assignors to Chichibu Cement Co., Ltd. and Ozawa Concrete Industry Co., Ltd., both of, Japan

Continuation-in-part of Ser. No. 631,185, Jul. 16, 1984, abandoned, which is a division of Ser. No. 473,132, Mar. 7, 1983, Pat. No. 4,594,513. This application May 14, 1985, Ser. No. 733,902

Claims priority, application Japan, Nov. 8, 1982, 57-195758

Int. Cl.[4] B28B *21/36, 21/56*

U.S. Cl. 264—40.1 **14 Claims**



1. A process for fabricating a high integrity container having a three-layered wall structure, for the burial of intermediate and low level radioactive wastes for a term of at least about one hundred years, comprising:

placing an inner mold within a metal vessel to define a space therebetween;

placing an hydraulic concrete mix, comprising cement, water, aggregate, a fibrous reinforcing material selected from the group consisting of steel fibers in an amount up to two volume per cent, glass fibers, carbon fibers and polymer fibers, and an additive of a water reducing agent or an expansive admixture to prevent cracking, into the space between said metal vessel and said inner mold;

curing the hydraulic concrete mix with steam to form a solidified concrete liner;

removing the inner mold, and drying the concrete liner at about 100°–150° C. for about 8–48 hours, whereby a thin gap is formed between the vessel and the concrete liner, and venting evolved water vapor from said thin gap;

inserting a core within the concrete liner and closing the metal vessel with an air-tight top cover;

applying vacuum to evacuate air and vapor from within said metal vessel;

charging under reduced pressure to the interior of said metal vessel a liquid impregnant to a level above the top of said concrete liner;

returning the pressure within said metal vessel to approximately at least atmospheric pressure, and allowing the increased pressure to effect impregnation of voids within said concrete liner and to effect filling of said thin gap with said liquid impregnant;

removing the core and excess liquid impregnant from within said liner, and solidifying said liquid impregnant under increased pressure up to 5 kg/cm^2 gauge to form an impervious impregnated concrete liner and a thin intermediate layer between said metal vessel and said concrete liner, said thin intermediate layer being integral with said impregnant within said concrete liner, said thin intermediate layer adhering to the interior of said metal vessel; and

testing the resultant high integrity container for air leaks.

4,687,615

METHOD OF PRODUCING BIAXIALLY ORIENTED TUBULAR POLYETHERETHERKETONE FILMS

Kazuo Kondo, Marugame, and Satoshi Maruyama, Nakatado, both of Japan, assignors to Okura Industrial Co., Ltd., Marugame, Japan

Filed Sep. 16, 1985, Ser. No. 776,545
Int. Cl.[4] B29C *47/88*
U.S. Cl. 264—557 **11 Claims**

1. A method of producing biaxially oriented tubular polyetheretherketone films having good optical and mechanical properties and heat resistance, comprising rapidly quenching at a rate of at least 24° C. per second, an unoriented tubular polyetheretherketone film as melt-extruded through a circular die, thereby imparting a crystallinity of not greater than 10% to the film, and continuously introducing the thus-produced film into the space between a feed nip roll pair and a pull nip roll pair while reheating the film externally to a temperature of 60°–140° C. and introducing air into the hollow interior of said tubular film to allow the film to expand under the influence of the internal pressure thus created to an areal draw ratio of 4–36, to thereby attain biaxial orientation.

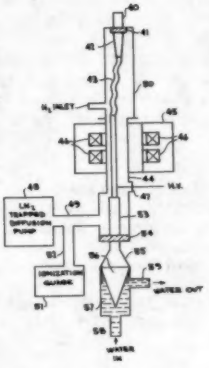
4,687,616

METHOD AND APPARATUS FOR PREVENTING CYCLOTRON BREAKDOWN IN PARTIALLY EVACUATED WAVEGUIDE

Charles P. Moeller, Del Mar, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 15, 1986, Ser. No. 818,946
Int. Cl.[4] B23K *9/00*
U.S. Cl. 376—123 **10 Claims**

1. A method of preventing cyclotron breakdown in a partially evacuated waveguide used to insert microwave energy for electron cyclotron heating in a plasma magnetic confinement device comprising the steps of, applying a static magnetic field for confining the plasma in said device and applying an electrostatic field in order to remove electrons to prevent



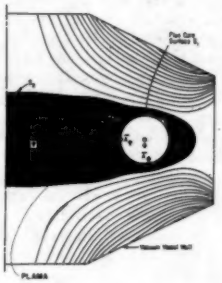
ionization of gas molecules and creation of more electron ion pairs in said waveguide.

4,687,617

STEADY-STATE INDUCTIVE SPHEROMAK OPERATION

Alan C. Janos, E. Windsor; Stephen C. Jardin, Princeton, and Masaaki Yamada, Lawrenceville, all of N.J., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 20, 1985, Ser. No. 703,577
Int. Cl.[4] G21B *1/00*
U.S. Cl. 376—137 **10 Claims**



1. A steady-state method of maintaining an inductively formed spheromak plasma comprising the steps of:

(a) inductively producing a spheromak plasma by:

evacuating a vacuum vessel and filling said vessel with a neutral species;

producing a first poloidal magnetic field within said vacuum vessel; producing a second poloidal magnetic field within said vacuum vessel by pulsing a current I_{PF} in a first direction through a poloidal field generating coil, the poloidal field generating coil being located in a toroidally shaped flux core within the vacuum vessel, such that the first and second poloidal magnetic fields are superimposed to form a composite poloidal magnetic field ψ within said vacuum vessel having regions of stronger and weaker strength;

producing a toroidal magnetic field Φ in said vacuum vessel by passing a current I_{TF} through a toroidal field generating coil which is located in the flux core, thereby initiating

a plasma discharge and causing toroidal flux to appear outside of the flux core;

expanding the plasma in the direction of said region of weaker poloidal magnetic field strength;

(b) forming a linked toroidal spheromak plasma from said expanded plasma in which some flux surfaces of said spheromak plasma link both the plasma and the core; and

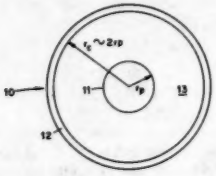
(c) oscillating the poloidal and toroidal magnetic fields ψ and Φ, while said plasma flux surfaces are linked to both the plasma and the core, such that ψ and Φ have different phases.

4,687,618

LASER-FUSION TARGETS FOR REACTORS

John H. Nuckolls, and Albert R. Thiessen, both of Livermore, Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Sep. 2, 1975, Ser. No. 609,841
Int. Cl.[4] G21B *1/00*
U.S. Cl. 376—152 **2 Claims**



1. In a target having a centrally located substantially spherically configured quantity of solid fuel for implosion by a pulse of laser energy and having no material therein with a Z of over about 13, the improvement comprising: means in spaced apart and non-contiguous relationship surrounding said fuel for at least providing an atmosphere about said fuel for ensuring electron transport around said fuel and enhancing subsequent implosion symmetry of said fuel, said fuel being configured as a hollow shell, said means consisting of at least one outer layer of substantially solid atmosphere forming material having a Z of 1–13, said atmosphere forming material comprising a shell positioned about said fuel defining a space therebetween, said space being filled with He, said fuel and said shell of atmosphere forming material being each composed of DT, said layer of atmosphere forming material being impacted and at least partially exploded by at least one separate and distinct laser prepulse to produce said atmosphere about said fuel prior to implosion of said fuel by said pulse of laser energy.

4,687,619

REMOVABLE TOP NOZZLE AND TOOL FOR A NUCLEAR REACTOR FUEL ASSEMBLY

John F. Wilson, Murrysville; Samuel Cerni, Pittsburgh, and Robert K. Gjertsen, Monroeville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

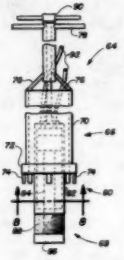
Division of Ser. No. 564,058, Dec. 21, 1983, Pat. No. 4,603,027. This application Oct. 3, 1985, Ser. No. 783,511
Int. Cl.[4] G21C *19/20*
U.S. Cl. 376—260 **5 Claims**

1. A tool used in a nuclear reactor fuel assembly for connecting and disconnecting an internally threaded collar threadably engagable with an externally threaded upper end of a control rod guide thimble, said tool comprising:

(a) rotation means engagable with said collar and operable to apply a torque in one direction to threadably connect said internally threaded collar on said thimble's externally threaded upper end and in an opposite direction to disconnect said collar from its threaded connection with said thimble; and

(b) gripper means adapted to be inserted into the upper end of said guide thimble and operable to prevent said thimble from rotating about its longitudinal axis as said rotation means applies torque to said collar in connecting and disconnecting said collar on and off said guide thimble;

(c) said gripper means being disposed within said rotation means and having a portion thereof projecting outwardly beyond said rotation means for insertion into said thimble when said rotation means is engaged with said collar, said gripper means including



(i) fluid power means having an elongated body portion which houses a double actuated piston rod with a flange mounted on a free end of the piston rod, and

(ii) an expandable material in the shape of a doughnut disposed on said rod adjacent said flange and adapted to be inserted along with said rod in its extended position into the upper end of said guide thimble;

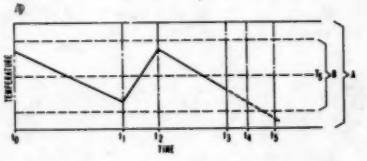
(iii) said material being axially compressed between said flange and said body portion as said rod is actuated to its retracted position causing said material to expand radially outwardly in frictionally gripping the inner wall of said thimble to thereby prevent relative rotation thereof.

4,687,620

SPECTRAL SHIFT REACTOR CONTROL METHOD

Albert J. Impink, Jr., Murrysville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 217,054, Dec. 16, 1980, Pat. No. 4,432,930. This application Aug. 4, 1983, Ser. No. 520,087
Int. Cl.[4] G21C *7/00*
U.S. Cl. 376—209 **10 Claims**



1. The method of closely controlling the reactor water coolant temperature of an operating spectral-shift nuclear reactor, said reactor comprising a core formed of a plurality of fuel assemblies through which said reactor water coolant flows; different types of elongated elements operable to be controllably moved into and out of said core; one type of said elongated elements comprising control rods formed of neutron absorbing material and operable to decrease reactivity through neutron absorption when inserted into said core; another of said types of elongated elements comprising displacer rods formed of material which has a low absorption for neutrons and which have overall neutron-absorbing and moderating characteristics essentially not exceeding those of hollow tubu-

lar Zircaloy members with a filling zirconium oxide or aluminum oxide, said displacer rods operating to displace an equivalent volume of water coolant fluid from said core when inserted therein to decrease reactivity and to increase reactivity when moved from said core; which method comprises:

establishing the reactor coolant temperature set point at which said water coolant is desired to be maintained in an operating reactor;

establishing first temperature band limits which are a first temperature amount above and below said temperature set point and which are water-coolant-initiating temperatures for initiating movement of said displacer rods;

establishing second temperature band limits which are a second temperature amount above and below said temperature set point and within which the temperature of said reactor coolant is desired to be maintained, and said first temperature band limits falling within said second temperature band limits; and

when measured reactor coolant temperature approaches a deviation from said temperature set point by an amount as established by said first temperature band limits, inserting or withdrawing a sufficient number of displacer rods with respect to the core to shift water coolant temperature toward the desired temperature set point; and

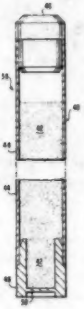
movement of said reactor control rods is initiated when said reactor coolant temperature differs from said temperature set point by said second temperature amount.

4,687,621

NUCLEAR FUEL ASSEMBLY WITH IMPROVED SPECTRAL SHIFT-PRODUCING RODS

Harry M. Ferrari, Pittsburgh, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 6, 1984, Ser. No. 638,333
Int. Cl.[4] G21C *7/04, 7/26*
U.S. Cl. 376—209 **6 Claims**



1. In a nuclear reactor having fuel assemblies and a moderator-coolant liquid flowing through said fuel assemblies, each fuel assembly including an organized array of nuclear fuel rods wherein said moderator-coolant liquid flows along said fuel rods, at least one improved spectral shift-producing rod disposed among said fuel rods, said spectral shift-producing rod comprising:

(a) an elongated hollow hermetically-sealed tubular member;

(b) a weakened region formed in a portion of said member, said portion being subject to rupture at a given level of internal pressure; and

(c) burnable poison material contained in said member which generates gas in said member as operation of the reactor proceeds normally, said material being soluble in said moderator-coolant liquid when brought into contact therewith;

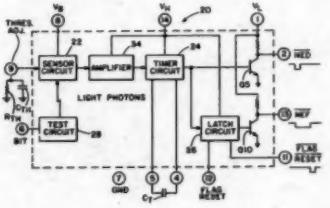
(d) said given level of internal pressure being less than the maximum level of internal pressure normally expected to be generated within said member by said poison material by normal operation of said reactor.

4,687,622

NUCLEAR EVENT DETECTOR

Larry L. Longden, San Diego, Calif., assignor to IRT Corporation, San Diego, Calif.

Filed Oct. 29, 1985, Ser. No. 792,572
Int. Cl.[4] G21C *17/00*
U.S. Cl. 376—254 **30 Claims**



12. A nuclear event detector for sensing the occurrence of a nuclear explosion causing the occurrence of a pulse of ionizing radiation having a pulse amplitude of at least about 5×10^5 rad(Si)/s and providing a first output signal which is a pulse of a duration predetermined prior to said event and further comprising a second output signal indicating an event has occurred, said detector comprising:

an ionizing radiation sensor for providing a sensor output signal upon an ionizing radiation pulse incident thereon exceeding a threshold level determined by the value of a first discrete eletrical component,

a pulse timer circuit responsive to said sensor output signal for providing said first output signal;

a latch circuit which is connected to said timer circuit and provides said second output signal when said timer circuit provides said first output signal and continues to provide said second output signal after the end of said first output signal;

a sealed enclosure in which said sensor, said pulse timer circuit and said latch circuit are enclosed; and

connection means extending from inside said enclosure to outside said enclosure and including first connector means adapted for connection to said first electrical component for setting said threshold level, said connection means further including second connector means adapted for connection to a second discrete electrical component for determining the duration of said first output signal.

4,687,623

SELF-COMPENSATING VOTED LOGIC POWER INTERFACE WITH TESTER

Henry F. Cook, Penn Hills Township, Allegheny County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 31, 1985, Ser. No. 793,422
Int. Cl.[4] G21C *17/00*
U.S. Cl. 376—259 **13 Claims**

6. A protection system for a nuclear reactor comprising:

redundant sets of sensors for monitoring preselected reactor parameters and operating conditions and for generating redundant partial actuation signals in response to preselected values and conditions;

three independent logic trains, to each of which each redundant partial actuation signal is applied, said logic trains each generating an actuation signal in response to a preselected number of the redundant partial actuation signals;

a load;

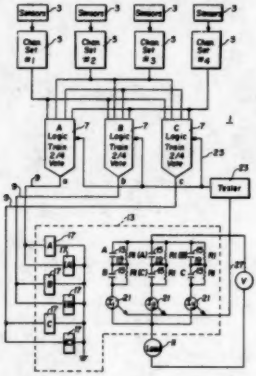
a voltage source;

three pairs of switches connected in three groups of two

switches each with the two switches in each group associated with a different pair of switches and being connected in series, and with the three groups of switches being connected in parallel with each other and in series with the load across the voltage source;

means for applying a different one of said actuating signals independently to each of said pairs of switches to actuate the same, and thereby actuate the load, when two out of the three actuation signals are generated;

a resistor shunting each switch to provide a leakage path through each group of switches, the impedance of said



resistors being several magnitudes larger than that of a closed switch such that the current through said leakage paths is insufficient to energize the load;

detector means connected to each group of switches and responsive to the change in impedance produced by actuation of a resistor shunted switch in the group to provide a digital signal having a first value when neither of the switches in the group is actuated and a second value when at least one of said switches in the group is actuated; and

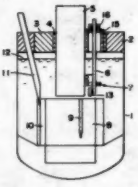
test means for selectively generating actuating signals and for monitoring said detector means for preselected patterns of said digital signals.

4,687,624

LIQUID METAL COOLED FAST BREEDER REACTOR

Mitsuru Kambe, Mito, and Shuichi Sasaki, Zama, both of Japan, assignors to Doryokuro Kakunenryo Kaihatsu Jigyodan, Tokyo, Japan

Filed Aug. 7, 1984, Ser. No. 638,613
Claims priority, application Japan, Aug. 16, 1983, 58-149376
Int. Cl.[4] G21C *19/10*
U.S. Cl. 376—264 **6 Claims**



1. A liquid metal cooled fast breeder reactor, including a reactor vessel, a reactor core within said reactor vessel, a shield plug device adapted to seal an upper opening of said reactor vessel, said shield plug device consisting of a fixed plug and at least a single rotating plug eccentrically rotatively mounted to said fixed plug, an upper core structure extending downwardly through said rotating plug toward said reactor core, and a fuel handling mechanism suspended vertically down into said reactor vessel through said rotating plug, said fuel handling mechanism comprising:

a fuel handling body,

a rotational driving device, mounted on said rotating plug so as to reduce therewith, for rotationally driving said fuel handling body with respect to said rotating plug about a fuel handling body axis of rotation, said rotational driving device supporting an upper portion of said fuel handling body, and

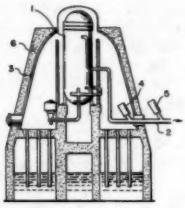
an aseismatic support fixed to and extending radially outwardly from said upper core structure, said aseismatic support securing a lower portion of said fuel handling body and including means for fixing said lower portion against radial and circumferential movement with respect to said upper core structure.

4,687,625

PIPING OF NUCLEAR REACTOR CONTAINMENT VESSEL

Kunio Hasegawa, Katsuta; Tasuku Shimizu, Hitachi; Tetsuo Horiuchi, Hitachi, and Hisao Ito, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 10, 1984, Ser. No. 659,563
Claims priority, application Japan, Oct. 13, 1983, 58-191386
Int. Cl.[4] G21C *9/00*
U.S. Cl. 376—292 **6 Claims**



1. Piping of a nuclear reactor containment vessel comprising:

pipes in the interior of the containment vessel passing through a wall of the containment vessel and extending to the outside of the containment vessel;

that portion of said pipes inside said containment vessel having no shut-off valve therein;

outer shut-off valves each provided at a portion of the pipe which is located at the outside of the containment vessel; and

isolating vessel means for covering a portion of the pipe extending from the containment vessel up to and including a portion of the pipe where the outer shut-off valve is located for isolating the covered portions of the pipe from atmosphere, thereby eliminating a requirement for an inner shut-off valve on the portion of the pipe in the interior of the containment vessel and enabling a reduction in size of the containment vessel.

4,687,626

PASSIVE SAFETY DEVICE FOR EMERGENCY STEAM DUMP AND HEAT REMOVAL FOR STEAM GENERATORS IN NUCLEAR POWER REACTORS

Long S. Tong, 9733 Lookout Pl., Gaithersburg, Md. 20879

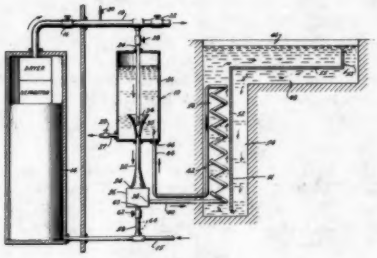
Filed Jan. 18, 1985, Ser. No. 692,568
Int. Cl.[4] G21C *9/00*
U.S. Cl. 376—298 **3 Claims**

1. In a pressurized water nuclear power reactor having at least one steam generator with a main feedwater line, a passive emergency steam dump comprising:

a first storage means for coolant water, the storage means having a drainage means to prevent excessive build-up of coolant water therein;

a steam jet ejector disposed within the first storage means and immersed in the coolant water the steam jet ejector having an inlet and an outlet;

means for feeding pressurized steam from the steam generator of a nuclear power reactor into the steam jet ejector;



heat exchange means for cooling the hot condensate from the steam jet ejector, the heat exchange means having an inlet and an outlet, the inlet of the heat exchanger means being connected to the outlet of the steam jet ejector, and the outlet of the heat exchange means being connected to the first storage means; and

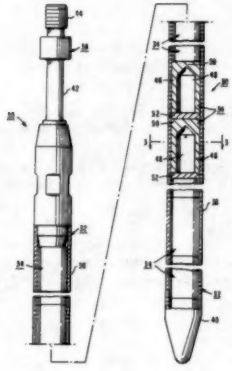
a second storage means for coolant water in which the heat exchange means is immersed.

4,687,627

WATER DISPLACER ROD WITH HOLLOW ANNULAR SUPPORT PELLETS HAVING SEALED INTERNAL VOIDS

John F. Wilson, Murrysville Boro; Robert K. Gjertsen, Monroeville Boro, and Samuel Cerni, Churchill Boro, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 13, 1984, Ser. No. 670,853
Int. Cl.[4] G21C *7/10, 5/00*
U.S. Cl. 376—333 **13 Claims**



1. In a fuel assembly for use in a nuclear reactor having moderator-coolant liquid flowing therein, said fuel assembly including an organized array of nuclear fuel rods and at least one improved water displacer rod disposed among said fuel rods for displacing a portion of the moderator-coolant liquid flowing along said fuel rods, said displacer rod comprising:

(a) an elongated hollow hermetically-sealed tubular member; and

(b) a plurality of pellets composed of a material substantially transparent to neutrons and disposed in a stacked relationship within said tubular member throughout the length of said member, each of at least a substantial number of said pellets having

(i) a body with opposite ends and a hollow annular cross-sectional shape defining a central void through said pellet, said central void of said body being substantially transparent to neutrons, and

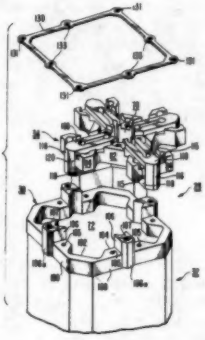
(ii) a solid web extending across and connected with at least one of said opposite ends of said body so as to close said void at said one body end such that said respective voids of said bodies of said pellets disposed in said stacked relationship are enclosed individually one from the next.

4,687,628

FLEXIBLE ROD GUIDE SUPPORT STRUCTURE FOR INNER BARREL ASSEMBLY OF PRESSURIZED WATER REACTOR

James E. Gillett, Greensburg; Daniel C. Garner, Murrysville, and Donald G. Sherwood, Monroeville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 798,220, Nov. 14, 1985, abandoned.
This application Oct. 24, 1986, Ser. No. 923,059
Int. Cl.[4] G21C *19/28*
U.S. Cl. 376—353 **32 Claims**



1. A flexible support structure for the upper ends of first and second pluralities of rod guides of respective first and second different types disposed as corresponding, interleaved first and second matrices thereof in parallel axial relationship within an inner barrel assembly of a pressurized water reactor vessel for receiving therein respective, corresponding first and second different types of rod clusters, the inner barrel assembly occupying a central portion of the vessel and being of a vertical height extending from a first plate of a lower elevation to a second plate of a higher elevation, each of said rod guides being of elongated configuration and of an axial length corresponding substantially to the vertical height of said inner barrel assembly and said first and second pluralities of rod guides being disposed in parallel axial relationship in an array of interleaved, respective first and second matrices with the bottom ends thereof affixed to said first plate and the top ends thereof disposed adjacent said second plate, comprising:

a first matrix of plural top support plates of a first type disposed on and connected to the respective top ends of said first plurality of rod guides of said first type, each said top support plate of said first type comprising a unitary structure of plural arm segments in an annular configuration and having a periphery generally corresponding to the configuration of the respectively associated top end of said rod guide of said first type and an interior opening permitting axial passage therethrough of a corresponding

rod cluster of said first type, said plural arm segments comprising a plurality of successive major arms having corresponding peripheries and the peripheries of successive pairs of adjacent major arms defining a plurality of corresponding exterior vertices;

a second matrix of plural top support plates of a second type disposed on and connected to the respective top ends of said second plurality of rod guides of said second type, each said top support plate of said second type comprising a unitary structure of plural arm segments having a periphery generally corresponding to the configuration of the top end of said respectively associated rod guides of said second type and an interior opening permitting axial passage therethrough of a corresponding rod cluster of said second type, said plural arm segments comprising a plurality of successive major arms having corresponding peripheries and the peripheries of successive pairs of adjacent major arms defining a plurality of corresponding interior vertices, the interior vertices of each said top plate of said second type corresponding to respective, exterior vertices of each said top plate of said first type for receiving a respective, said exterior vertex therein in mating relationship;

said first and second matrices of said top plates being assembled in interdigitated relationship with the interior vertices of said top plates of said second type within said array receiving, in mating relationship therein, respectively corresponding exterior vertices of respective, contiguous said top plates of said first type;

a linkage connecting position at each vertex of one of said first and second top plates and a linkage connecting position on each of the adjacent major arms of the pair associated with the mating vertex of the other of said first and second top plates; and

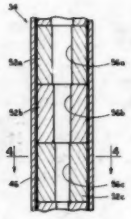
a flexible linkage interconnecting each said vertex linkage connecting position of said one of said first and second top plates with said linkage connecting positions on the respective adjacent major arms associated with the mating vertex, as received therein, of the other of said first and second top plates.

4,687,629

FUEL ROD WITH ANNULAR NUCLEAR FUEL PELLETS HAVING SAME U-235 ENRICHMENT AND DIFFERENT ANNULUS SIZES FOR GRADUATED ENRICHMENT LOADING

Claude M. Mildrum, Monroeville Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 27, 1986, Ser. No. 822,724
Int. Cl.[4] G21C *3/30*
U.S. Cl. 376—428 **4 Claims**



1. A fuel rod for a nuclear reactor fuel assembly, comprising:

(a) a hollow cladding tube;

(b) a pair of end plugs connected to and sealing said cladding tube at opposite ends thereof;

(c) a plurality of fuel pellets contained in said tube and being composed of fissile material having a single enrichment the value of which is at the level of the maximum enrichment loading of said rod, said pellets being provided in a stack having one end disposed adjacent to one of said end plugs and an opposite end disposed remote from the other of said end plugs; and

(d) a plenum spring disposed in said tube between said other end plug and said opposite end of said pellet stack for retaining said pellets in a stack form;

(e) at least some of said fuel pellets having an annular configuration and at least other of said fuel pellets having a solid configuration;

(f) each of some of said annular fuel pellets having an annulus of a first size;

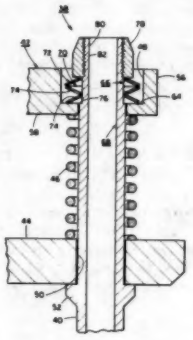
(g) each of other of said annular fuel pellets having an annulus of a second size different from said first size, whereby graduation of axial enrichment loading is provided between said annular fuel pellets of said fuel rod.

4,687,630

TOP NOZZLE AND GUIDE THIMBLE JOINT STRUCTURE IN A NUCLEAR FUEL ASSEMBLY

Robert K. Gjertsen, Monroeville Boro, and John F. Wilson, Murrysville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 13, 1985, Ser. No. 711,433
Int. Cl.[4] G21C *3/32*
U.S. Cl. 376—446 **10 Claims**



1. In a nuclear fuel assembly having at least one control rod guide thimble and a top nozzle, said guide thimble including an upper extension member, said top nozzle including a lower adapter plate supported on said guide thimble with said extension member extending above said lower adapter plate, an upper hold-down plate having a passageway slidably receiving an upper end portion of said extension member and at least one hold-down spring disposed between said plates so as to bias said upper hold-down plate for movement upwardly along said extension member in a direction away from said lower adapter plate, an improved joint structure flexibly interconnecting said hold-down plate with said upper end portion of said guide thimble upper extension member, said joint structure comprising:

(a) first overlapping means on said upper hold-down plate at side passageway thereof; and

(b) second overlapping means on said upper end portion of said guide thimble extension member;

(c) said first and second overlapping means being respectively disposed to interfere with one another so as to limit said upward movement of said hold-down plate along said guide thimble extension member in the direction away from said lower adapter plate;

(d) at least one of said first and second overlapping means being resiliently yieldable so as to bias said hold-down plate in an opposite direction toward said lower adapter plate and against the bias of said hold-down spring for

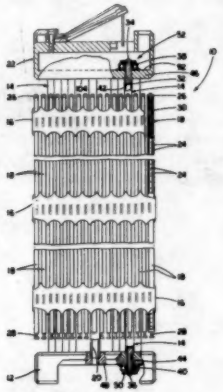
absorbing the energy of an impulse load applied to said hold-down plate in the direction upwardly along said guide thimble extension member so as to thereby limit transfer of said load to said guide thimble extension member.

4,687,631

TOP NOZZLE MOUNTED REUSABLE FASTENER DEVICE IN A RECONSTITUTABLE NUCLEAR FUEL ASSEMBLY

John F. Wilson, Murrysville Boro; Robert K. Gjertsen, Monroeville, and Harry M. Ferrari, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 12, 1985, Ser. No. 775,209
Int. Cl.[4] G21C *3/32*
U.S. Cl. 376—446 **6 Claims**



1. In a fuel assembly including a top nozzle with an adapter plate having at least one hole and at least one longitudinal structural member with a threaded upper end portion extendible through the adapter plate hole so as to project therefrom, a reusable fasterner device comprising:

(a) attaching means threadable onto and from said upper end portion of said structural member between fastened and unfastened positions therewith for attaching and detaching said structural member to and from said top nozzle adapter plate; and

(b) retaining means mounted on said top nozzle adapter plate so as to extend about said adapter plate hole and project outwardly from said adapter plate, said retaining means capturing said attaching means when in both said fastened and unfastened positions thereof and maintaining said attaching means with said top nozzle upon removal from said upper end portion of said structural member;

(c) said attaching means including

(i) a central tubular stem having upper and lower opposite ends and being internally threaded for mating with said threaded upper end portion of said structural member, and

(ii) an upper flange connected to and extending radially outwardly from said upper end of said central stem, said upper flange having a lower surface and a periphery adapted for engagement in order to rotate said attaching means for threading onto and unthreading from said structural member upper end portion between said fastened and unfastened positions;

(d) said retaining means including

(i) a tubular hollow body having upper and lower opposite ends and a plurality of upper sectors connected to and extending radially inwardly from said upper end of said tubular body,

(ii) said upper sectors together defining a central opening sized to receive said central stem of said attaching means and an interrupted upper surface surrounding said central opening which matches said lower surface on said upper flange of said attaching means being disposed above said upper sectors of said retaining means,

(iii) said upper sectors being disposed in a location spaced from said adapter plate at which their interrupted upper surface will be contacted by said lower surface of said upper flange of said attaching means when said central stem thereof is threaded onto said upper end portion of said structural member to said fastened position therewith,

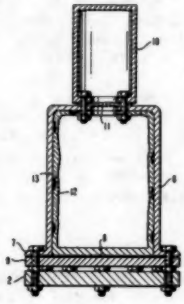
(iv) said upper sectors being yieldably deflectible upon being contacted by said upper flange of said attaching means such that inner edges of said upper sectors engage said central stem of said attaching means so as to rotationally lock said attaching means to said adapter plate when said attaching means is at said fastened position.

4,687,632

METAL OR ALLOY FORMING REDUCTION PROCESS AND APPARATUS

Frank W. Hurd, deceased, late of Corvallis; by Susan M. Hurd, executor, 977 NW. Ironwood, Corvallis, both of Oreg. 97330, and by Harland C. Hurd, executor, 1639 Jefferson, Eugene, Oreg. 97402

Filed May 11, 1984, Ser. No. 609,393
Int. Cl.[4] C22C *1/00, 14/00, 16/00, 27/02*
U.S. Cl. 419—45 **7 Claims**



1. A reduction process for the production of a product metal which includes the step of reacting a reducible metal compound and a reducing metal in a sealed reaction zone by heating the reactants without any substantial agitation from a temperature below the melting point of the reducing metal to a temperature which is both above the melting point of the reducing metal and below the temperature at which the reduction reaction between the metal compound and the reducing metal will proceed spontaneously; initiating a reduction reaction between a reducible metal compound and a molten reducing metal by causing the surface of the molten reducing metal to be suddenly disrupted, thereupon releasing the reaction mixture from said first reaction zone into a product collection zone while permitting the reduction reaction to continue to thereby produce a reduced metal in zero valent state.

5. The process of claim 1, wherein the reducible metal compound comprises a mixture of reducible metal compounds, comprising a major amount of a first reducible metal compound and a minor alloying amount of at least a second reducible metal compount.

4,687,633

LEAD MATERIAL FOR CERAMIC PACKAGE IC

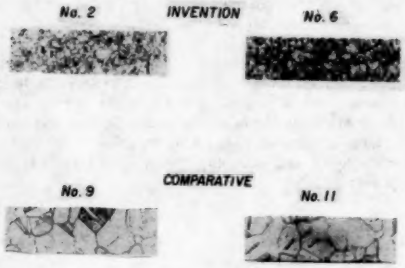
Motohisa Miyafuji, Shimonoseki; Tateo Yuchi, Kitakyushu, and Riichi Tsuno, Shimonoseki, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Jan. 7, 1986, Ser. No. 816,897

Claims priority, application Japan, Feb. 1, 1985, 60-18432; Feb. 1, 1985, 60-18431

Int. Cl.[4] C22C 9/04

U.S. Cl. 420—481 7 Claims



1. A lead material for ceramic package ICs which consisting essentially of Ni 1.0–5.0 wt%, Co 0.2–1.0 wt%, Si 0.2–1.5 wt%, Zn 0.1–5.0 wt%, Cr 0.001–0.1 wt%, and Mn 0.02–1.0 wt%, with the remainder being Cu and inevitable impurities.

4,687,634

PROCESS FOR INHIBITING CORROSION OF METAL SURFACES

Maurice Baseman, Pittsburgh, and Harold Swift, Gibsonia, both of Pa., assignors to Ronco Laboratories, Inc., Pittsburgh, Pa.

Filed Oct. 31, 1986, Ser. No. 925,789

Int. Cl.[4] C23F 11/00; C04B 9/02

U.S. Cl. 422—7 19 Claims

1. A process for inhibiting corrosion of metal surfaces in a closed system which comprises maintaining in said system a composition containing a major amount of an oleaginous vehicle and minor amounts of an oil-soluble hydrophilic cosolvent and the reaction product of substantially equimolar proportions of a dicyclohexylamine and a C_7 organic acid.

4,687,635

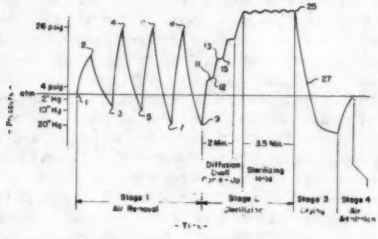
POROUS LOAD VAPOR STERILIZATION CYCLE

Kristine M. Kaehler, Erie; Ronald P. Krahe, Girard; Peter T. Miraldi, and Richard A. McBride, both of Erie, all of Pa., assignors to American Sterilizer Company, Erie, Pa.

Filed Oct. 5, 1984, Ser. No. 658,396

Int. Cl.[4] A61L 2/20

U.S. Cl. 422—26 12 Claims



1. A method of increasing the temperature and pressure within a sealable chamber wherein a porous load is disposed for processing and from both of which noncondensable gases have been substantially removed comprising:

after sealing said chamber, subjecting said chamber to a plurality of pressurization steps wherein a condensable vapor having transferable latent heat is so injected into said chamber that (a) said plurality of pressurization steps are sufficient to so gradually elevate the temperature and pressure within said chamber to a predetermined temperature and pressure effective for processing said porous load that the opportunity for substantially surpassing said predetermined temperature is substantially eliminated, and (b) said plurality of pressurization steps are sufficient to permit such penetration of said porous load by said vapor that said porous load reaches a general temperature equilibrium with said vapor in said chamber at about the same time as said chamber reaches said predetermined temperature to avoid superheating said chamber relative to said porous load;

each said pressurization step including a pressure rise during which said vapor is injected into said chamber followed by a pressure plateau, greater than the previous pressure plateau, during which said chamber is isolated and said vapor is not injected into said chamber to permit said vapor injected during said pressure rise to penetrate said porous load to displace noncondensable gases and to permit said chamber and said porous load temperatures to stabilize.

4,687,636

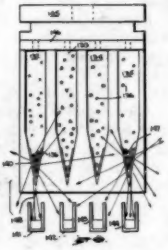
SEPARATIVE SCINTILLATION PROXIMITY ASSAY

Hiram Hart, 3450 Wayne Ave., Bronx, N.Y. 10467

Filed Jan. 3, 1984, Ser. No. 567,687

Int. Cl.[4] G01N 21/63, 9/30, 33/537

U.S. Cl. 422—57 2 Claims



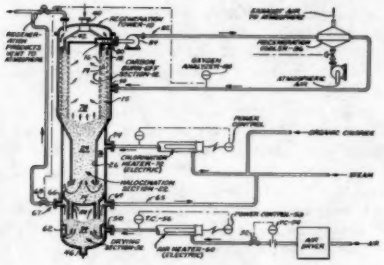
1. A centrifugal unit of use in a plurality of scintillation proximity assay of biological materials consisting essentially of a top portion, body portion, and bottom portion, said top portion having a unitary hollow space adapted to receive a separably engaged cover providing fluid access to said hollow portion, said body portion having a plurality of hollow elongated sections each of which terminates in a portion of restricted volume circumscribed by a surface of a transparent section of said bottom portion, each of said hollow elongated sections having fluid communication with said hollow top portion, all said circumscribed surfaces provided with a fluorescent coating adapted to be activated by radiation to give a detectable light pulse correlative to said biological material in each of said hollow sections.

4,687,637

CATALYST REGENERATION APPARATUS

Arthur R. Greenwood, Niles, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Feb. 3, 1986, Ser. No. 825,296
Int. Cl.[4] G05D 7/00; B01J 8/08; C10C 38/26
U.S. Cl. 422—62 6 Claims



1. Apparatus for effecting regeneration of spent catalyst particles used in hydrocarbon conversion reactions comprising:

(a) a vertically-positioned vessel having a catalyst inlet and catalyst outlet, through which catalyst particles may move by gravity from said inlet to said outlet, which vessel has an outer wall and includes a cylindrical upper section comprised of a burn-off zone and a cylindrical lower section comprised of a catalyst halogenation zone and a catalyst drying zone;

(b) two vertical cylindrical catalyst retention screens having differing diameters which extend substantially throughout said burn-off zone, which are concentric with one another to form an annular volume through which a descending bed of catalyst may move by gravity, and which are concentrically disposed in said burn-off zone to form an annular space for distribution of gas between the outer wall of said vessel and the larger diameter screen and to form a central cylindrical space enclosed by said smaller diameter catalyst retention screen for collection of gas;

(c) said halogenation zone, which includes a cylindrical wall having a lower end, said cylindrical wall being spaced from the outer wall of the vessel to define an annular chamber which distributes halogenation gas about the lower end of said cylindrical wall, the halogenation zone being in communication with said burn-off zone in such a manner that catalyst moves from the burn-off zone to the halogenation zone and halogenation gas flows into said burn-off zone central cylindrical space after passing through catalyst in the halogenation zone;

(d) said drying zone, which is located below said halogenation zone and is comprised of a lower portion containing catalyst, an upper portion devoid of catalyst, an inlet means for dry hot air, and means to distribute dry hot air about the lower portion of the drying zone such that it passes upward through the catalyst located in the drying zone;

(e) a partition which is located between the halogenation zone and the drying zone, which substantially prevents gas flow between the halogenation zone and the drying zone, and which includes means which allow catalyst to move downward from the halogenation zone to the drying zone;

(f) a first piping arrangement which is in communication with said drying zone upper portion in order to remove air therefrom and in communication with said annular chamber in order to supply gas thereto, said first piping arrangement also having means for adding a halogen to the air flowing in the first piping arrangement;

(g) a second piping arrangement which is in communication with said burn-off zone central cylindrical space in order to remove gas therefrom and in communication with said burn-off zone gas distribution space in order to supply gas thereto;

(h) a drying zone vent pipeline which is in communication with said drying zone in order to remove air therefrom; and,

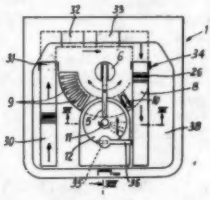
(i) a control arrangement comprising an oxygen analyzer having a sensor positioned in said second piping arrangement for sensing oxygen concentration in said second piping arrangement and a control valve means, said control valve means being located in said drying zone vent pipeline and varying the flow of air in said vent pipeline in response to oxygen concentration in said second piping arrangement, thereby causing the amount of air which is supplied to the burn-off zone from the drying zone through the halogenation zone to vary.

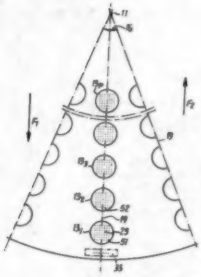
4,687,638

DEVICE FOR DETECTING AND QUANTIFYING AGGLUTINATES

Alain C. A. Benajam, 36 avenue Karl Marx, 93000 Bobigny, France

Continuation of Ser. No. 542,198, Oct. 14, 1983, abandoned.
This application Sep. 30, 1985, Ser. No. 781,210
Claims priority, application France, Oct. 14, 1982, 82 17635
Int. Cl.[4] G01N 21/13, 31/02, 33/48, 35/04
U.S. Cl. 422—73 7 Claims





1. A device for the detection and quantification of agglutinates, which agglutinates are capable of being formed under the action of at least one liquid reagent by particles in suspension in doses of liquids to be tested, comprising:

(A) a horizontal disc positioned and arranged for rotation about a spindle having a first vertical axis, said horizontal disc having a plurality of pits disposed on a first surface thereof to form uniform linear arrangements of pits along radii of said disc, the bottom of each of said plurality of pits being transparent;

(B) an oscillating arm rotatable about a second vertical axis and having as many taking and restituting means as there are pits disposed along each one of said radii, said taking and restituting means being positioned and arranged on

said oscillating arm for taking doses of liquid reagents and of liquids to be tested from corresponding reservoirs of reagents and liquids to be tested and for dispensing simultaneously such doses into a radial linear arrangement of pits in the rotating disc;

(C) a horizontal fixed linear arrangement of a plurality n of photosensitive elements;

(D) a fixed light source located on an opposite side of the horizontal plane of said disc than said horizontal fixed linear arrangement, said linear arrangement of photosensitive elements and said light source being positioned and arranged with respect to said disc so that light from the light source can pass through an adjacent one of said plurality of pits to said linear arrangement of photosensitive elements;

(E) a means for horizontally moving said disc step-by-step m times in a direction generally at right angles to said linear arrangement of photosensitive elements, such that the amount of light from said light source passing through said bottom of each of said pits is detected m times by each of said n photosensitive elements, so as to form for each said bottom a total of $n \times m$ points of detection distributed over a rectangular region, said rectangular region occupying a major part of the surface of the bottom of each pit;

(F) means for controllably rotating said horizontal disc about said first vertical axis to successively bring each of said linear arrangements of pits into position for observation by said horizontal fixed linear arrangement; and

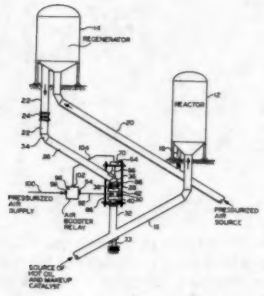
said means for horizontally moving said disc including a carriage mounted on a rail for sliding movement thereon in the horizontal direction, said spindle being mounted on said carriage for rotation relative to said carriage, and said means for controllably rotating said disc comprising a motor supported on said carriage and positioned and arranged to rotatably drive said spindle.

4,687,639

APPARATUS FOR ACCOMMODATING TEMPERATURE AND PRESSURE VARIATIONS IN TUBULAR CONDUITS

James D. Whiteside, II, Borger, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 7, 1982, Ser. No. 366,211
Int. Cl.[4] B01J *8/18;* **F16L** *55/00*
U.S. Cl. 422—112 **38 Claims**



1. Apparatus providing a movable coupling between a first conduit and a second conduit for conveying a pressurized fluid, comprising:

first bellows means in fluid flow communication between said first conduit and said second conduit for conveying the pressurized fluid and providing means for movement between said first conduit and said second conduit including longitudinal movement along a first longitudinal axis in response to forces applied thereto including the pressure of the pressurized fluid conveyed thereby while maintaining said fluid flow communication;

second bellows means located near said first bellows means having a first portion and a second portion, said first and second portions being longitudinally movable relative to one another along a second longitudinal axis substantially parallel to said first longitudinal axis in response to the application of fluid pressure thereto;

first connecting means fixedly securing said first portion of said second bellows means to said first conduit for preventing relative longitudinal movement between said first conduit and said first portion of said second bellows means;

second connecting means securing said second portion of said second bellows means to said second conduit for limiting longitudinal movement of said second conduit away from said second portion of said second bellows means to a predetermined maximum;

said first and second connecting means mutually cooperating so that movement of the first portion of said second bellows means relative to the second portion of said second bellows means in a first direction along the second portion of said second bellows means in a first direction along the second longitudinal axis results in a corresponding longitudinal contraction of said first bellows means, and, alternately, so that a longitudinal extension of said first bellows means results in a corresponding movement of the first portion of said second bellows means relative to the second portion of said second bellows means in an opposite second direction along the second longitudinal axis; and

actuator means communicating between said second bellows means and the pressurized fluid being conveyed through said first bellows means for causing the application of a proper amount of fluid pressure to said second bellows means so that the first and second portions of said second bellows means are urged to move relative to one another along the second longitudinal axis with an amount of force sufficient to prevent the extension of said first bellows means in response to the pressure of the pressurized fluid conveyed through said first bellows means;

said actuator means comprising:

first conduit means having first and second end portions with the first end portion thereof in fluid flow communication with said second bellows means and with the second end portion thereof in fluid flow communication with a source of pressurized fluid for conveying fluid from said source of pressurized fluid to said second bellows means; and

pressure regulating means interposed in said first conduit means and operatively connected to the pressurized fluid conveyed through said first bellows means for regulating the pressure of the pressurized fluid conveyed to said second bellows means in response to the pressure of the pressurized fluid conveyed through said first bellows means.

4,687,640

CHLORINE GAS FILTERING MATERIAL SUITABLE FOR USE IN A CHEMICAL OXYGEN GENERATOR

Samuel P. Schillaci, Tonawanda, N.Y., assignor to Figgie International Inc., Willoughby, Ohio

Filed Nov. 8, 1985, Ser. No. 796,720
Int. Cl.[4] B01D *23/00;* **A62B** *7/00*
U.S. Cl. 422—120 **6 Claims**

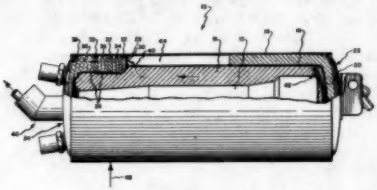
1. A chemical oxygen generator comprising:

a housing including a shell, an ignition head assembly and a discharge head assembly;

a chlorate candle core disposed within the shell; and

filtering material disposed between the core and the shell, said filtering material including a chlorine getter consist-

ing of a vacuum baked high surface area carbonate method hopcalite impregnated with a hydroxide selected



from the group consisting of sodium hydroxide and potassium hydroxide.

4,687,641

APPARATUS FOR PREPARING PRE-EXPANDED THERMOPLASTIC RESINS

Hirofumi Maeda, Takatsuki; Kyoichi Nakamura, Osaka, and Hisatoshi Fukui, Toyonaka, all of Japan, assignors to Kanegafuchi Kogaku Kogyo Kabushiki Kaisha, Osaka, Japan

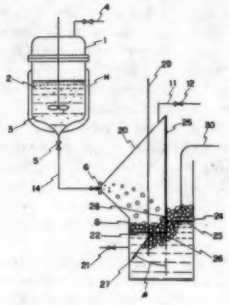
Division of Ser. No. 647,659, Sep. 6, 1984, Pat. No. 4,525,485. This application Apr. 8, 1985, Ser. No. 720,820

Claims priority, application Japan, Sep. 8, 1983, 58-166144; Sep. 8, 1983, 58-166145

The portion of the term of this patent subsequent to Aug. 11, 2004, has been disclaimed.

Int. Cl.[4] C08J *9/18;* B01J *10/00*

U.S. Cl. 422—133 **5 Claims**



1. An apparatus for preparing pre-expanded particles of a thermoplastic resin which comprises a pressure vessel for heating under an elevated pressure an aqueous dispersion comprising thermoplastic resin particles containing a volatile foaming agent and an aqueous liquid; a low pressure vessel for pre-expanding said thermoplastic resin particles; release line means for releasing the aqueous dispersion from the pressure vessel into the low-pressure vessel; said low pressure vessel comprising wall means defining a closed portion and an open portion, and a separation wall; the thermoplastic resin particles containing the volatile foaming agent released through said release line means being pre-expanded and the volatile foaming agent contained in the particles being volatilized within said closed portion, said closed portion and open portion being partitioned by the separation wall which has a lower end spaced from a bottom wall of the low-pressure vessel, and said closed portion and said open portion communicating with each other through a space between the lower end of said separation wall and the bottom wall of said low-pressure vessel; means for maintaining a liquid level in the closed portion and a liquid level in the open portion above said lower end of the separation wall so that a sealed space is formed in the closed portion; means for discharging the volatilized foaming agent from the closed portion of the low-pressure vessel and for controlling the inner pressure within the closed portion at a pressure lower than that in said pressure vessel; and removal means for removing the pre-expanded particles from the closed portion and for forcing the expanded particles below the lower end of said separation wall.

4,687,642

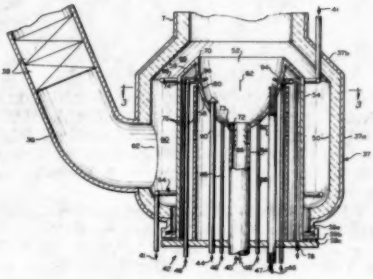
FLUID FEED APPARATUS

Richard H. Nielsen, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation of Ser. No. 689,676, Jan. 8, 1985, abandoned. This application Dec. 4, 1986, Ser. No. 936,995

Int. Cl.[4] C10G *11/16;* B09B *1/26*

U.S. Cl. 422—140 **13 Claims**



1. An apparatus comprising:

a hollow member having an interior surface, a first open end which defines an opening, and a second end opposite said first open end, said interior surface defining a chamber having an axis, and wherein said interior surface has an interior surface boundary at said second end, wherein substantially all of said interior surface progressively tapers generally toward said axis from said open end to said boundary; and

fluid feed means for injecting oil into said chamber in a direction generally toward the opening and also injecting from a position closely adjacent to the boundary an atomizing fluid into said chamber, wherein said fluid feed means includes a source of slurry oil, a source of topped crude oil, a source of atomizing fluid, at least one topped crude nozzle connected to said source of topped crude oil positioned to empty topped crude oil from a first position within said chamber, and at least one slurry nozzle comprising an outer tube connected to said source of slurry oil and an inner tube connected to said source of atomizing fluid, said inner tube being positioned within said outer tube and having a slot therein which extends only partially around the circumference of said inner tube such that atomizing fluid exits the slot in a direction toward said axis so as to shear slurry oil being emptied from said outer tube, said slurry nozzle emptying slurry oil from a second position within said chamber, and wherein said second position is radially spaced farther from said axis than said first position, radial spacing being measured along lines perpendicular to said axis.

5. An apparatus comprising:

a hollow member having an interior surface, a first open end which defines an opening, and a second end opposite said first open end, said interior surface defining a chamber having an axis, and wherein said interior surface has an interior surface boundary at said second end, wherein substantially all of said interior surface progressively tapers generally toward said axis from said open end to said boundary;

fluid feed means for injecting oil feedstock into said chamber

in a direction generally toward the opening such that the feedstock exits said chamber through the opening, said fluid feed means also injecting into said chamber an atomizing gas for atomizing the oil feedstock, wherein said fluid feed means includes a plurality of nozzles which empty into said chamber;

a means for introducing a fluidized cracking catalyst adjacent said chamber opening such that the catalyst mixes with oil feedstock exiting said chamber to yield a mixture; and

a riser-reactor for receiving the mixture.

4,687,643

APPARATUS FOR PREPARING MONODISPERSED, SPHERICAL, NON-AGGLOMERATED METAL OXIDE PARTICLES HAVING A SIZE BELOW ONE MICRON

Paolo Cortesi, Chivasso; Gianni Donati, Rho, and Giuseppe Saggese, Novara, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Division of Ser. No. 582,546, Feb. 22, 1984, Pat. No. 4,574,078. This application Nov. 22, 1985, Ser. No. 800,692

Claims priority, application Italy, Feb. 25, 1983, 19819 A/83

Int. Cl.[4] **C09C** *1/00;* **C01G** *23/047;* **B05B** *7/02;* **B01F** *3/04*

U.S. Cl. 422—150 **2 Claims**

1. An apparatus for preparing spherical, submicronic, monodispersed and non-aggregated particles of metal oxides comprising a convergent-divergent ejector terminating in a cylindrical portion coaxially positioned within a vertically positioned cylindrical chamber along it's longitudinal axis, wherein the diameter of the chamber is at least twice the diameter of the cylindrical portion of the ejector, the cylindrical chamber bounded at one end by a curved bottom and said convergent-divergent ejector is disposed such that it penetrates said curved bottom; an apertured plate disposed within said cylindrical chamber such that said cylindrical portion of the ejector passes coaxially through said apertured plate; said ejector further including an ejector chamber at an end thereof distal from said cylindrical portion and an ejector nozzle positioned in said ejector chamber for feeding an inert gas stream into said convergent-divergent ejector; means for feeding hydrolyzable metal compound vapors into said ejector chamber, and means on the curved bottom for the inflow of steam.

4,687,644

PROCESS AND ARRANGEMENT FOR THE INCREMENTAL ENRICHMENT OF DEUTERIUM AND/OR TRITIUM IN A MATERIAL SUITABLE FOR THE ISOTOPE EXCHANGE OF DEUTERIUM AND/OR TRITIUM WITH HYDROGEN

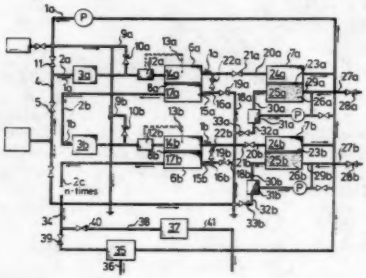
Nicolaos Iniotakis, Julich, and Claus-Benedict von der Decken, Aachen, both of Fed. Rep. of Germany, assignors to Kernforschungsanlage Julich GmbH, Julich, Fed. Rep. of Germany

Division of Ser. No. 387,479, Jun. 11, 1982, Pat. No. 4,533,539. This application May 16, 1984, Ser. No. 610,857

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1981, 3123860

Int. Cl.[4] **C01B** *4/00, 5/00*

U.S. Cl. 422—159 **8 Claims**



1. Apparatus for the incremental enrichment of one or both of deuterium and tritium in a material adapted for the isotope exchange of one or both of deuterium and tritium with hydrogen, comprising a plurality of sequentially connected enrichment stages for the enrichment of one or both of deuterium and tritium in said material,

each of said enrichment stages comprising water reduction means and isotope exchange means,

said water reduction means comprising a water reduction chamber having a first carrier gas inlet adapted to convey water containing one or both of deuterium and tritium to said water reduction chamber and a first carrier gas outlet adapted to convey a gaseous mixture comprising hydrogen and one or both of deuterium and tritium from said water reduction chamber and,

said isotope exchange means comprising a primary exchange chamber and a secondary exchange chamber separated by a commonly shared isotope exchange wall,

said isotope exchange wall being adapted to allow the permeation therethrough of one or both of gaseous deuterium and tritium isotopes from said primary exchange chamber to said secondary exchange chamber,

said primary exchange chamber having a second carrier gas inlet and a first exhaust gas outlet and being in fluid flow communication with said water reduction means through said first carrier gas outlet and said second carrier gas inlet over first carrier gas line means so as to receive a flow of a gaseous mixture of hydrogen and one or both of deuterium and tritium from said water reduction means,

and said first exhaust line outlet is adapted to exhaust a flow of a gaseous mixture of hydrogen and one or both of deuterium and tritium from said primary exchange chamber,

said secondary exchange chamber having a third carrier gas inlet and a second exhaust gas outlet; said third carrier gas inlet being adapted to provide a flow of a mixture of isotope exchange medium and carrier gas to said secondary exchanger chamber and said second exchaust gas outlet is adapted to convey a flow of isotope exchange medium enriched with one or both of deuterium and tritium from said secondary exchange chamber, and

wherein each of said second carrier gas inlet and said third carrier gas inlet are located so that the flow of gaseous mixture in said primary exchange chamber is in countercurrent flow relation relative to the flow of said mixture of isotope exchange medium and carrier gas in said secondary exchange chamber.

4,687,645

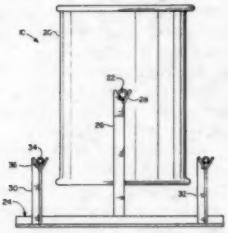
COMPOSTING UNIT

Christian D. Harvey, 1209 W. Lake Ave., Baltimore, Md. 21210

Filed Sep. 29, 1982, Ser. No. 427,880

Int. Cl.[4] B01J *1/00*

U.S. Cl. 422—184 **1 Claim**



1. In a system employing a drum with holes in it for composting waste material such as vegetation, aided by means for rotating the drum on a stand, the drum having means for loading waste material to be composted and for removing compost, the improvement comprising: the drum being cylindrical, means permitting cyclically dropping a charge of waste material from one end of the drum to the other through said rotating, including transverse axle structure at the drum circumference and means on the stand for rotatably holding said transverse axle structure in substantially horizontal orientation for rotating said drum end-over-end, means for admitting air to said charge of waste material, including a perforate tube extending between a first hole in a first end of the drum and a second hole in a second end of the drum, means for forcing air, from said means for admitting air, through said charge of waste material as result of said dropping, the means for forcing air including a blockage intermediate the length of said perforate tube, the means for forcing air further including a first adjustable shutter on a first end of said perforate tube and a second adjustable shutter on a second end of said perforate tube, said perforate tube being fixed to said first end of the drum, said first end of the drum being fixed as part of the drum, and said means for loading waste material to be composted and for removing compost comprising said second end of the drum being removable.

4,687,646

COLD CRUCIBLE FOR MELTING AND CRYSTALLIZING NON-METALLIC INORGANIC COMPOUNDS

Werner D. Mateika, Ellerbek; Rolf Laurien, Pinneberg, and Manfred R. Liehr, Hamburg, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

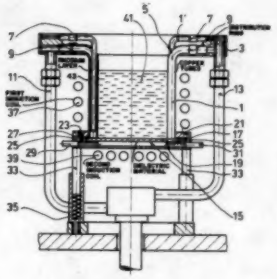
Filed May 2, 1984, Ser. No. 606,019

Claims priority, application Fed. Rep. of Germany, May 6, 1983, 3316546

Int. Cl.[4] B01D *9/00*

U.S. Cl. 422—248 **3 Claims**

1. In a cold crucible for melting and crystallizing non-metallic inorganic compounds, said crucible having a cooled crucible wall comprising metal pipes through which pipes cooling liquid may flow and which pipes are coupled to the bottom of the crucible through which bottom cooling liquid may also flow, and having a first induction coil surrounding the wall of the crucible by which first induction coil high-frequency energy can be applied to the contents of the crucible, wherein the improvement comprises a second induction coil which can be controlled independently of the first induction coil surrounding the wall of the crucible is positioned below the bottom of the crucible, the metal pipes comprising the wall of the crucible are mechanically joined to at least one distributor ring,



which distributor ring is movable vertically so as to raise and lower the wall of the crucible, the bottom of the crucible comprises a plate which is vertically displaceable from the wall of the crucible, which plate consists of a dielectric material and below which plate cooling liquid may flow and which plate is held in a holder which holder is connected to a plurality of spring journalled supports.

4,687,647

CONVERSION OF MOLYBDENITE TO MOLYBDENUM DIOXIDE USING PETROLEUM OR COAL TAR PITCHES

Lloyd Berg, 1314 S. Third Ave., Bozeman, Mont. 59715

Filed Jan. 8, 1987, Ser. No. 1,623

Int. Cl.[4] C01G *39/00, 39/02, 39/06*

U.S. Cl. 423—53 **5 Claims**

1. A method for converting molybdenite, MoS_2, into molybdenum dioxide MoO_2, which comprises mixing about two parts of powdered molybdenite into one part of a molten low volatile carbonaceous material, heating the mixture in the presence of air to 400°–600° F., allowing the sulfur content to evolve as sulfur dioxide, SO_2, and allowing the air to convert the molybdenum to molybdenum dioxide.

4,687,648

SODIUM-LIMESTONE DOUBLE ALKALI FLUE GAS DESULFURIZATION PROCESS WITH IMPROVED LIMESTONE UTILIZATION

Robert J. Biolchini, Algonquin; Willard L. Boward, Jr., Hoffman Estates, and Kuei-Hsiung Wang, Arlington Heights, all of Ill., assignors to FMC Corporation, Philadelphia, Pa.

Filed Jun. 24, 1986, Ser. No. 877,820

Int. Cl.[4] C01B *17/00*

U.S. Cl. 423—242 **21 Claims**

1. In a sodium-limestone double alkali process for the continuous desulfurization of flue gas, having the steps of absorbing sulfur dioxide from an SO_2-containing gas stream in an absorber with an aqueous solution of sodium sulfite and sodium bisulfite, diverting at least a portion of the absorber effluent solution for regeneration with limestone, introducing limestone into the diverted absorber effluent solution to convert bisulfite to sulfite, separating by-product solids from the limestone-treated solution, and returning regenerated solution to the absorber, the improvement for increasing the utilization of the limestone used during the regeneration operation which comprises

(a) introducing a major portion of the absorber effluent

solution diverted for limestone regeneration into a regeneration tank circuit;

(b) contacting the absorber effluent solution in the regeneration tank circuit with ground limestone, the level of solids in the regeneration tank circuit being maintained at a concentraion below 5 wt % solids;

(c) removing a dilute slurry from the regeneration tank circuit, the slurry containing substantially regenerated solution, by-product calcium sulfite/sulfate solids, and incompletely-reacted ground limestone, and introducing the slurry to a thickener to concentrate the slurry solids content to at least twice the solids content of the regeneration tank circuit;

(d) returning regenerated solution obtained as overflow from the thickener to the absorber;

(e) transferring concentrated slurry obtained as thickener underflow to an after-reactor circuit, into which is also introduced the balance of absorber effluent solution diverted for regeneration, thereby facilitating further reaction of incompletely-reacted ground limestone in the concentrated slurry; and

(f) removing slurry from the after-reactor circuit and separating the substantially reacted solids from the liquor, the liquor being recycled to the thickener or to the regeneration tank circuit.

4,687,649

FLUE GAS DESULFURIZATION PROCESS

Hiroshi Kuroda; Tsukasa Nishimura; Masakatsu Nishimura; Taiki Hashimoto; Osamu Kanda; Shigeru Nozawa, and Kenji Shibata, all of Kure, Japan, assignors to Babcock-Hitachi Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 350,598, Feb. 22, 1982, Pat. No. 4,487,784. This application Jan. 16, 1984, Ser. No. 571,065

Claims priority, application Japan, Sep. 9, 1983, 58-166363

The portion of the term of this patent subsequent to Dec. 11, 2001, has been disclaimed.

Int. Cl.[4] C01B *17/00;* **C01F** *11/46*

U.S. Cl. 423—242 **9 Claims**

1. A limestone-gypsum flue gas desulfurization process which comprises:

a cooling step of cooling and dedusting a dust HCl and sulfur oxides (SO_x)-containing flue gas and producing an effluent containing chlorine;

an absorption step of contacting the flue gas cooled in the cooling step with a limestone slurry to absorb and remove SO_x contained in the gas thereby forming $CaSO_3$ and $Ca(HSO_3)_2$ and producing cleaned gas;

a pH-adjusting step of adjusting the pH of the resulting slurry containing calcium sulfite $CaSO_3$ and calcium hydrogen sulfite $Ca(HSO_3)_2$ formed in the absorption step;

an oxidation step of oxidizing the resulting slurry obtained in the pH-adjusting step, by contacting it with an oxygen-containing gas to form a gypsum-containing slurry;

a liquid-separation concentration step of concentrating the resulting gypsum-containing slurry obtained in the oxidation step to produce clarified water and a concentrated gypsum slurry; and

a step of centrifugally separating gypsum from the concentrated gypsum slurry to produce separated gypsum and a filtrate; and

a step of removing heavy metals, removing COD (chemical oxygen demand) components, and electrodialytically concentrating and eliminating chlorine in the effluent discharged from said cooling step.

9. A limestone-gypsump flue gas desulfurization process which comprises:

a cooling step of cooling and dedusting a sulfur oxides (SO_x)-containing flue gas and producing an effluent;

an absorption step of contacting the flue gas cooled in the cooling step with a limestone (lime) slurry to absorb and remove SO_x contained in the gas thereby forming $CaSO_3$ and $Ca(HSO_3)_x$ and producing cleaned gas;

a pH-adjusting step of adjusting the pH of the resulting slurry containing calcium sulfite $CaSO_3$ and calcium hydrogen sulfite $Ca(HSO_3)_2$ formed in the absorption step to be in the range of 4 to 5;

an oxidation step of oxidizing the resulting slurry obtained in the pH-adjusting step, by contacting it with 1.5 to 3 times the theoretical amount of an oxygen-containing gas to form a gypsum-containing slurry;

a liquid-separation concentration step of concentrating the resulting gypsum-containing slurry obtained in the oxidation step to produce clarified water and a concentrated gypsum slurry; and

a step of centrifugally separating gypsum from the concentrated gypsum slurry to produce separated gypsum and a filtrate;

adding the separated gypsum from said step of centrifugally separating to the limestone slurry in said absorption step in an amount of at least 5% by weight of the slurry;

a step of treating the effluent discharged from said cooling, including at least one step of the steps of removing floating solids (FS), removing fluorine (F), removing heavy metals, removing (chemical oxygen demand) components and concentrating chlorine (C), in the effluent wherein said effluent-treating step includes a step of adjusting the pH of the effluent to 1.5 or less for decomposing dithionic acid in the effluent, and a step of heating the effluent of a pH of 1.5 or less to 60 C. or higher; and

said effluent-treating step further including a step of absorbing dithionic acid in the effluent onto a weakly basic ion exchange resin, followed by desorbing the acid from the resin in advance of said pH-adjusting step.

4,687,650

METHODS OF EXTRACTING HYDROGEN FROM A GAS

Paul D. Goodell, Ridgewood, N.J.; Ernest L. Huston, Tuxedo Park, N.Y.; Peter S. Rudman, and Gary D. Sandrock, both of Ringwood, N.J., assignors to Ergenics, Inc., Wyckoff, N.J. and Air Products and Chemicals, Inc., Allentown, Pa.

Division of Ser. No. 279,713, Jul. 2, 1981, Pat. No. 4,589,919. This application Feb. 26, 1986, Ser. No. 833,066

Int. Cl.[4] C01B *1/26*

U.S. Cl. 423—248 **2 Claims**

1. A method for extracting hydrogen from a gas stream containing hydrogen with or without other gases by a sorption-desorption process using as the hydrogen sorber a bed of a porous, metallurgically bonded, heat-ballasted hydridable mixture in pellet form consisting of at least 60% by volume of a heat-ballast metal powder and not more than 40% by volume of a hydridable metal.

4,687,651

METHOD FOR PRODUCING AMMONIUM POLYPHOSPHATE

John A. Parker, Los Altos, Calif.; Rubin Feldman, Ladue, and Robert L. Bryant, Webster Groves, both of Mo., assignors to Thermal Science, Inc., St. Louis, Mo.

Filed Oct. 15, 1985, Ser. No. 787,429

Int. Cl.[4] C01B *15/16, 25/26*

U.S. Cl. 423—315 **12 Claims**

1. A process for the manufacture of substantially water-insoluble ammonium polyphosphate, comprising a step of mixing one part of a polyphosphoric acid having an equivalent phosphoric acid content of at least about 110% and an excess of urea, to form a partially soluble ammonium polyphosphate having a solubility of about 8% in water, and a second step of heating the partially soluble ammonium polyphosphate under an ammonia atmosphere to a temperature of at least 300° C. for a period sufficient to form a substantially water-insoluble ammonium polyphosphate.

4,687,652

LOW TEMPERATURE FORMATION OF MULLITE USING SILICON ALKOXIDE AND ALUMINUM ALKOXIDE

Bulent E. Yoldas, and Deborah P. Partlow, both of Pittsburgh, Pa., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 28, 1986, Ser. No. 867,727

Int. Cl.[4] C01B *33/26*

U.S. Cl. 423—327 **7 Claims**

1. A method for preparing mullite which comprises the steps of:

(a) partially hydrolyzing a solution of a silicon alkoxide in an alcohol by adding about 0.1 to 1.0 moles of water per mole of stoichiometric mullite to said silicon alkoxide solution;

(b) adding a solution of an aluminum alkoxide in an alcohol to the resulting partially hydrolized silicon alkoxide solution in a ratio of 3 mols of aluminum alkoxide per mol of silicon alkoxide to provide a solution having a concentration of not greater than about 10 percent by weight equivalent oxide;

(c) heating the resulting solution to a temperature about 50° to 0° C. below the normal boiling temperature of the alcohol diluent for about 8 to 48 hours;

(d) recovering an amorphous material having the mullite composition from said resulting solution; and

(e) heating said amorphous material to about 985° C. thereby converting said amorphous material to crystalline mullite.

4,687,653

PROCESS FOR PREPARATION OF ZEOLITE OE HAVING AN OFFRETITE TYPE STRUCTURE

Junji Arika, Tokuyama; Kazushige Igawa, and Keiji Itabashi, both of Shinnanyo, all of Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Shinnanyo, Japan

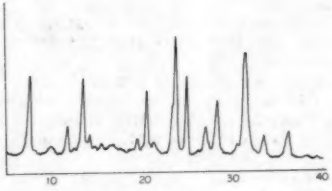
Division of Ser. No. 539,734, Oct. 6, 1983, abandoned. This application Nov. 7, 1985, Ser. No. 795,863

Claims priority, application Japan, Oct. 8, 1982, 57-176078; Oct. 18, 1982, 57-181409

The portion of the term of this patent subsequent to Jul. 23, 2002, has been disclaimed.

Int. Cl.[4] C01B *33/28*

U.S. Cl. 423—329 **6 Claims**



1. A process for the preparation of zeolites having lattice spacings of the X-ray powder diffraction diagram substantially shown in Table 1 which zeolite is capable of adsorbing at least 1% by weight (as measured at 25° C. under 48 mmHg) of cyclohexane without a calcination treatment at a temperature higher than 350° C. and without using tetramethylammonium ions or chloine, which process comprises:

reacting an aqueous alkali metal silicate solution with an aqueous aluminum-containing solution while both solutions are simultaneously and continuously supplied into a reaction vessel, to obtain a granular amorphous aluminosilicate containing aluminum in an amount of 4 to 22% by weight as Al_2O_3 (on the anhydrous base) and having a particle size of 10 to 100 microns,

separating the granular amorphous aluminosilicate from a mother liquor,

adding the granular amorphous aluminosilicate into a solution of at least one compound selected from the group consisting of an alkali metal hydroxide and an alkali metal silicate to form a reaction mixture having a composition defined by the following molar ratios:

$SiO_2/Al_2O_3 = 10\text{–}30$,

$OH/SiO_2 = 0.4\text{–}0.85$,

$H_2O/SiO_2 = 12\text{–}60$, and

$K/M = 0.2\text{–}0.8$

where M stands for the total of the alkali metals, and then crystallizing the mixture with stirring at a temperature of 130° to 180° C. for a period of 5 to 40 hours.

4,687,654

PROCESS FOR PREPARING ZSM-5, LARGE PORE MORDENITE AND ZSM-35

Marco Taramasso, deceased, late of S. Donato Milanese (by Irene Gatti, heir); Bruno Notari; Giovanni Manara, both of S. Donato Milanese, and Giuseppe Bellussi, Piacenza, all of Italy, assignors to Snamprogetti, S.p.A., Milan, Italy

Continuation of Ser. No. 508,554, Jun. 28, 1983, abandoned. This application Aug. 5, 1985, Ser. No. 762,567

Claims priority, application Italy, Jul. 1, 1982, 22176 A/82

Int. Cl.[4] C01B *33/28*

U.S. Cl. 423—329 **14 Claims**

1. A process for preparing porous crystalline aluminosilicates said process consisting of the steps of:

(a) bringing into contact, in an aqueous environment and in the absence of organics, ammonia and ammoniacal substances, sodium silicate with an aluminum derivative at a molar SiO_2/Al_2O_3 ratio greater than or equal to 8, in the presence of one or more alkaline hydroxides at a molar Me^+/SiO_2 ratio greater than 0.6, where Me^+ represents the alkaline metal or metals, and in the presence of a mineralizing agent selected from the group consisting of sodium sulphate, potassium sulphate, sodium phosphate, potassium phosphate, sodium chloride and potassium chloride, and

(b) conducting the reaction at a temperature between 20° and 100° C. while controlling the molar OH^-/SiO_2 ratio of the reaction mixture between 0.01 and 0.8, the resulting mixture being crystallized at said molar ratio of OH^-/Si_2 in a closed environment for a period of between several hours and 40 days at a temperature between 100° and 200° C.

11. A process as defined in claim 1 wherein ZSM-35 is prepared by using an SiO_2/Al_2O_3 ratios of 8–25; a Me^+/SiO_2 ratio of >0.6; a H_2O/SiO_2 ratio of 20–100; and a OH^-/SiO_2 ratio of 0.01–0.25.

13. A process as defined in claim 1 wherein mordenite is prepared using a SiO_2/Al_2O_3 ratio of 10–200; a Me^+/SiO_2 ratio of >0.6; a H_2O/SiO_2 ratio of 10–100; and a OH^-/SiO_2 ratio of 0.2–0.80.

4,687,655

PROCESS FOR THE MANUFACTURE OF SHAPED ARTICLES FROM REACTION-BONDED SILICON NITRIDE BY NITRIDATION UNDER ELEVATED NITROGEN GAS PRESSURE

Klaus Hunold, Lauben; Alfred Lipp, Bad Worishofen; Klaus Reinmuth, Durach; Peter Arnold, Sulzberg, and Johannes Napholcz, Kempten, all of Fed. Rep. of Germany, assignors to Elektroschmelzwerk Kempten GmbH, Munich, Fed. Rep. of Germany

Filed Apr. 11, 1986, Ser. No. 850,748

Claims priority, application Fed. Rep. of Germany, Apr. 19, 1985, 3514284

Int. Cl.[4] C04B *35/58;* C01B *21/063*

U.S. Cl. 423—344 10 Claims

1. A process for the manufacture of shaped articles of reaction bonded silicon nitride by nitridation of preshaped articles of silicon powder which comprises

(a) placing the preshaped article of silicon powder in the furnace chamber of a pressure vessel, applying a nitrogen gas pressure of at least 6 MPa to said preshaped article in the pressure vessel and increasing the temperature at a heating rate of not more than 50° C. per hour to a reaction temperature below the melting point of silicon at which the reaction of the nitrogen with the silicon occurs;

(b) maintaining said preshaped article at the reaction temperature below the melting point of silicon and under the nitrogen gas pressure of at least 6 MPa in the pressure vessel for at least 0.5 hours to form a prenitridated article;

(c) heating said prenitridated article at a heating rate of at least 500° C. per hour to a final temperature above the melting point of silicon and maintaining said prenitridated article at the temperature above the melting point of silicon and under the nitrogen gas pressure of at least 6 MPa in the pressure vessel for from 1 to 7 hours until at least 95 percent of the silicon originally present have been converted into silicon nitride.

4,687,656

LONGITUDINAL REACTOR FOR CHEMICAL SYNTHESES IN GAS PHASE AND HETEROGENEOUS CATALYSTS

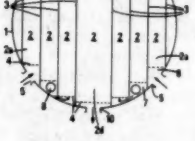
Dang V. Quang, Paris; Claude Pradel, Rueil Malmaison; Jean P. Euzen, Dardilly, and Jean-Francois Le Page, Rueil Malmaison, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed May 20, 1983, Ser. No. 496,375

Claims priority, application France, May 21, 1982, 82 08997

Int. Cl.[4] B01J *8/04;* C01C *1/04*

U.S. Cl. 423—361 17 Claims



1. A process for carrying out gaseous chemical reactions in a reaction zone (1) (FIG. 5) defined by an enclosure of substantially cylindrical shape and of substantially circular cross-section, the process being effected in the presence of a solid catalyst, the process being characterized in configuring the reaction zone into a plurality of enclosures (2), said enclosures containing a catalyst and being elongate in the axial direction and of parallelepipedic shape in radial cross-section and being adjacent to one another, the cross-sections of said enclosures being substantially contained within a circle coaxial to the circle defined by the circular section of the reaction zone, such that the enclosures vary in depth according to the corresponding subtense of the coaxial circle, the adjacent axial side walls (3) of these enclosures or the common axial side walls of the adjacent enclosures being tight to the gases circulated in the reaction zone, the axial end walls (4) of these enclosures being permeable to the gases throughout the entire area thereof, introducing the gases into the reaction zone and circulating the gases successively through each of the enclosures in a direction substantially perpendicular to the axes of the reaction zones by supplying the gases to each enclosure through one of said permeable end walls and discharging the gases therefrom through a permeable end wall opposite to the wall through which the gases have been supplied.

4,687,657

FABRICATION OF SIC - ALN ALLOYS

Terence J. Clark, and Robert E. Johnson, both of Summit, N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Jun. 9, 1986, Ser. No. 872,312

Int. Cl.[4] C04B *35/64*

U.S. Cl. 423—412 18 Claims

1. A process for forming an aluminum nitride ceramic comprising; pyrolyzing an organoaluminum preceramic polymer containing a backbone comprised of alternating aluminum- and nitrogen-containing groups at a temperature above 1,000° C. in an inert atmosphere.

2. The process of claim 1 wherein said organoaluminum polymer is a poly-N-alkyliminoalane containing repeating units represented by the formula:

in which R is an aliphatic, cycloaliphatic or aromatic radical.

4,687,658

METAL CHELATES OF DIETHYLENETRIAMINEPENTAACETIC ACID PARTIAL ESTERS FOR NMR IMAGING

Steven C. Quay, Menlo Park, Calif., assignor to Salutar, Inc., Sunnyvale, Calif.

Filed Oct. 4, 1984, Ser. No. 657,676

Int. Cl.[4] A61K *49/00;* A61B *5/05, 6/00*

U.S. Cl. 424—9 27 Claims

1. A chemically stable physiologically tolerable contrast agent in a solid state, for use in vivo solution during diagnostic magnetic resonance imaging (MRI), to enhance the MRI image of a subject within the MRI scanning magnetic field, comprising:

a contrast agent of the form:

E-DTPA-PM,

where:

E-DTPA is an ethylene triamine pentaacetic acid chelator in which at least one of the five acetic acid groups has become a functional ester group E of the form:

E=—COO—$(CH_2)_{n-1}$—CH_3,

wherein "n" is an integer from 1 to 16 indicating the number of Carbon atoms in the Carbon-Hydrogen portion of the ester group E,

for functionally cooperating with the in vivo environment; and

PM is a paramagnetic metal ion having an atomic charge of +Z, securely chelated at a plurality of coordination points into the E-DTPA chelator to chemically isolate the PM(+Z) ion from the in vivo environnent, for locally affecting the magnetic field of the MRI system;

whereby the contrast agent causes a reduction in the T1 relaxation time near the region of interest within the subject.

4,687,659

DIAMIDE-DTPA-PARAMAGNETIC CONTRAST AGENTS FOR MR IMAGING

Steven C. Quay, Menlo Park, Calif., assignor to Salutar, Inc., Sunnyvale, Calif.

Filed Nov. 13, 1984, Ser. No. 671,106
Int. Cl.[4] A61K *49/00*; A61B *5/05, 6/00*
U.S. Cl. 424—9 27 Claims

1. A chemically stable physiologically tolerable contrast agent in a solid state, for use in vivo solution during diagnostic magnetic resonance (MR) imaging, to enhance the MR image the region of interest of a subject within the MR scanning magnetic field, comprising:

a composition of matter of the form:

A-DTPA-PM(+Z),

where:

A-DTPA is an ethylene triamine pentaacetic acid chelator in which at least one of the five acetic acid groups has become a functional amide group A of the form:

$A=-CONH-(CH_2)_{n-1}-CH_3$, wherein "n" is an integer up to 16 indicating the number of Carbon atoms in the Carbon-Hydrogen portion of the amide group A,

for functionally cooperating with the in vivo environment; and

PM(+Z) is a paramagnetic metal ion having an atomic charge of Z, securely chelated at a plurality of coordination points into the A-DTPA chelator to chemically isolate the PM(+Z) ion from the in vivo environment, for locally affecting the magnetic field of the MR system;

whereby the contrast agent causes a reduction in the T1 relaxation time near the region of interest within the subject.

4,687,660

PHARMACEUTICAL DELIVERY SYSTEM

Richard W. Baker, Mountain View, Calif., and James W. Brooke, Sisters, Oreg., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Filed Aug. 15, 1984, Ser. No. 640,951
Claims priority, application United Kingdom, Aug. 16, 1983, 8322007
Int. Cl.[4] A61K *9/22, 9/32, 31/60*
U.S. Cl. 424—465 6 Claims

1. A tablet comprising a core containing the admixture of a water-soluble medicine and a water-soluble osmotic enhancing agent in an amount by weight about equal to or greater than the weight of the medicine, said core having a water-insoluble, water-permeable coating surrounding said core, said coating containing particulate, water-soluble, pore-forming material dispersed therein.

4,687,661

METHOD FOR PRODUCING LIPOSOMES

Hiroshi Kikuchi, and Hitoshi Yamauchi, both of Tokyo, Japan, assignors to Daiichi Seiyaku Co., Ltd., Tokyo, Japan

Filed Jun. 27, 1984, Ser. No. 625,078
Claims priority, application Japan, Jun. 29, 1983, 58-118006
Int. Cl.[4] A61K *31/70, 9/10, 39/02*
U.S. Cl. 424—38 13 Claims

1. A method for producing liposomes which comprises:

(A) mixing liposome membrane components with a water-soluble, physiologically acceptable, non-volatile organic solvent which is in a liquid state at a temperature of from 70°–90° C., wherein said water-soluble, physiologically acceptable, non-volatile organic solvent is at least one member selected from the group consisting of glycerin, polyglycerin, propylene glycol, polypropylene glycol, ethylene glycol, triethylene glycol, polyethylene glycol, diethylene glycol monoethyl ether, 1,3-butylene glycol, maltitol, glycerin esters and benzyl alcohol, and

(B) dispersing the resulting mixture in an aqueous medium.

4,687,662

THERAPEUTIC EFFERVESCENT COMPOSITION

Alexander M. Schobel, North Plainfield, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 775,931, Aug. 30, 1985, abandoned, which is a continuation-in-part of Ser. No. 740,144, May 31, 1985, abandoned. This application Jan. 15, 1986, Ser. No. 819,093
Int. Cl.[4] A61K *31/60, 37/00, 31/13*; A61L *9/04*
U.S. Cl. 424—44 14 Claims

1. A rapid dissolving therapeutic effervescent composition which comprises:

(1) a preblended mixture present in an amount from about 7 to about 57.5% by weight of

(A) a granulated therapeutic agent having a particle size of about 100 to about 600 microns, wherein the granulated therapeutic agent comprises a therapeutic agent present in an amount from about 2% to about 27% by weight selected from the group consisting of acetaminophen, aspirin, ibuprofen and mixtures thereof, and a water soluble granulating agent present in an amount from about 0.03 to about 2.5% by weight, being compatible with the therapeutic agent and having a viscosity below 100 cps, 10% by weight, at 25° C. in water, and

(B) a component of an effervescent system having a particle size of about 50 to about 600 microns, present in an amount from about 5% to about 30% by weight said component being selected from the group consisting of a carbonate, an acid and mixtures thereof, and

(2) an effervescent system present in an amount from about 42.5% to about 90% by weight wherein the effervescent system comprises a carbonate containing material and an acid, all percentages are by weight of the total effervescent composition.

4,687,663

DENTAL PREPARATION, ARTICLE AND METHOD FOR STORAGE AND DELIVERY THEREOF

Hans A. Schaeffer, 18 Pallant Ave., Linden, N.J. 07036

Continuation-in-part of Ser. No. 737,157, May 23, 1985, abandoned, which is a continuation-in-part of Ser. No. 471,188, Mar. 1, 1983, Pat. No. 4,528,180. This application Jun. 17, 1985, Ser. No. 745,993
Int. Cl.[4] A61K *7/16, 7/18, 7/20*
U.S. Cl. 424—52 17 Claims

1. A method for cleaning teeth comprising extruding a first semi-solid component comprising hydrogen peroxide as an active ingredient, said first component being suitable for oral use;

extruding a second semi-solid component comprising sodium bicarbonate as an active ingredient, said second component being suitable for oral use;

placing said first component and said second component in contact with each other on a toothbrush; and

brushing said teeth using said first and second components concurrently as a cleaning medium.

4,687,664

METHOD OF INACTIVATING REPRODUCIBLE PATHOGENS

Anton Philapitsch, Ebenfurt; Günter Wöber, Oberwaltersdorf; Johann Eibl, and Otto Schwarz, both of Vienna, all of Austria, assignors to Immuno Aktiengesellschaft fur chemisch-medizinische Produkte, Vienna, Austria

Filed Apr. 30, 1984, Ser. No. 605,658

Claims priority, application Austria, May 2, 1983, 1593/83; May 2, 1983, 1592/83; May 2, 1983, 1591/83; May 2, 1983, 1590/83

Int. Cl.[4] A61K *39/395;* **C12N** *9/00, 7/04*

U.S. Cl. 424—85 **15 Claims**

1. A method of inactivating reproducible pathogens in a preparation containing plasmatic enzymes on proenzymes, activated or non-activated coagulation factors, prothrombin complex preparations, plasmatic inhibitors, immunoglobulins or other blood products comprising adding ammonium sulfate to said preparation to attain a salt concentration of more than 0.5 molar, thermally treating said preparation for a period of time sufficient to inactivate the pathogens and removing said ammonium sulfate from said preparation.

4,687,665

BIOLOGIC AND METHOD OF PREPARING SAME

Robert L. Stout, Overland Park, Kans., assignor to Clinical Reference Laboratory, Inc., Lenexa, Kans.

Division of Ser. No. 598,744, Apr. 10, 1984, Pat. No. 4,572,834. This application Oct. 10, 1985, Ser. No. 785,990

Int. Cl.[4] A61K *35/14, 35/16, 39/00*

U.S. Cl. 424—86 **3 Claims**

1. A method of treating a mammal in order to increase the Natural Killer cell population thereof, said method comprising the step of administering by injection to the mammal a biologic, said biologic being produced by the method of:

(1) injecting a feline panleukopenia or canine origin parvovirus into an animal other than a feline or canine, and which is a non-permissive host for the virus;

(2) permitting said injected animal to react to the presence of said virus for a period of time of at least one month for developing in the animal's blood serum said biologic such that 50 microliters of the animal's serum, when added to an in vitro human white blood cell culture containing $2\text{–}4\times10^5$ white blood cells and followed by three days incubation at 37° C. under a 5% CO_2/95% air atmosphere, will give rise to at least about a 50% increase in T-Helper and Natural Killer cells in the biologic-supplemented cell culture as compared with an otherwise identical and identically cultured in vitro cell culture having added thereto 50 microliters of serum from a normal animal of the same species as said injected animal, such rise in T-Helper and Natural Killer cells being detected by staining with fluorescent-labelled monoclonal antibodies against T-Helper and Natural Killer cells; and

(3) recovering blood from said injected animal containing said biologic, and fractionating the recovered blood serum or plasma removed from the red blood cells, with the in vitro assay being performed on each separated fraction, in order to insure or determine that the biologic is retained throughout, by the selection of only positive serum or plasma fractions to separate potentially interfering substances from the biologic.

4,687,666

VACCINE FOR LEISHMANIASIS

Jose A. O'Daly, Caracas, Venezuela, assignor to Ministerio de Sanidad y Asistencia Social Instituto Venezolano de Investigationes Cientificas, Caracas, Venezuela

Filed Feb. 19, 1985, Ser. No. 703,176

Int. Cl.[4] A61K *39/008;* **C12N** *1/10*

U.S. Cl. 424—88 **8 Claims**

1. A vaccine against Leishmaniasis comprising killed cells of the genus Leishmania, said parasites having been killed in the amastigote stage by incubation in vitro at the stationary phase of growth in a medium containing an amount of N-p-tosyl-L-lysine chloromethyl ketone or a pharmacologically acceptable salt thereof effective to kill said cells.

4,687,667

METHOD OF TREATING FUNCTIONAL BOWEL DISORDERS BY THE ADMINISTRATION OF PEPPERMINT OIL TO THE INTESTIVE

John Rhodes, Cardiff, and Brian K. Evans, South Glamorgan, both of United Kingdom, assignors to J. B. Tillott Limited, London, United Kingdom

Continuation of Ser. No. 182,583, Aug. 29, 1980, abandoned, which is a continuation of Ser. No. 20,049, Mar. 13, 1979, abandoned. This application Jan. 26, 1983, Ser. No. 461,011

Int. Cl.[4] A61K *35/78*

U.S. Cl. 424—195.1 **4 Claims**

1. A method of treating irritable colon syndrome in humans which comprises administering selectively to the intestine of a human with irritable colon syndrome 0.05 to 3.0 ml of peppermint oil as an enteric preparation or rectal suppository.

4,687,668

CONTINUOUS MICROBIOLOGICAL PRODUCTION OF ACETIC ACID AND VINEGAR

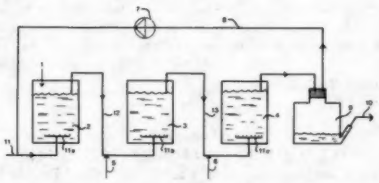
Charles Ghommidh; Jean-Marie Navarro, both of Montpellier; Philippe Girardon, and Jean Amen, both of Versailles, all of France, assignors to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Filed Nov. 12, 1985, Ser. No. 796,781

Claims priority, application France, Nov. 13, 1984, 84 17235

Int. Cl.[4] C12J *1/00;* **C12P** *7/54*

U.S. Cl. 426—17 **18 Claims**



1. A process comprising at least two stages for the continuous production of vinegar by microbiological conversion of ethanol substrate into acetic acid comprising:

a first stage comprising microbiologically converting ethanol into acetic acid in the presence of air to consume oxygen in the air;

measuring the amount of oxygen in the completed first stage;

a second stage comprising adding oxygen as an aeration gas to the first stage as required by the conversion process to form a superoxygenated atmosphere;

recycling the aeration gas;

expelling the aeration gas as shown as the carbon dioxide content thereof reaches a threshold value of 7%;

closing the recycling circuit and reconstituting the superoxygenated atmosphere with pure oxygen.

4,687,669

PROCESS FOR PRODUCTION OF ENRICHED RICE OR BARLEY

Shintaro Moritaka, deceased, late of Kobe, Japan (by Junko Moritaka, Kazuya Moritaka, Takuya Moritaka, heirs); Yasuhiko Watanabe, and Motoyuki Nishimura, both of Kobe, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Jan. 6, 1984, Ser. No. 568,923
Claims priority, application Japan, Jan. 14, 1983, 58-4423
Int. Cl.[4] A23B *9/00*; A23L *1/302, 1/303, 1/304*
U.S. Cl. 426—72 11 Claims

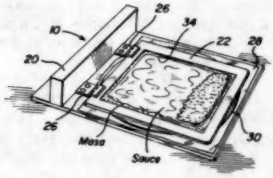
1. A process for producing enriched polished rice or rice or barley, which comprises incorporating or letting depositing nutrients in or on polished rice or barley grains, and subsequently coating the resultant grains with an aqueous emulsion containing an oil/fat and a wax wherein each of the components melts at about 40° to 80° C.

4,687,670

TAMALE MAKING METHOD

John G. Rodriguez, 65 W. Mill St., Porterville, Calif. 93258

Filed Jan. 6, 1986, Ser. No. 816,444
Int. Cl.[4] A23P *1/00*; A21C *9/06*
U.S. Cl. 426—297 4 Claims



1. The method of preparing a tamale prior to cooking or freezing, said method comprising the steps of:

A. placing a first protective heat resistant and flexible sheet over a flat horizontal and upwardly facing food preparation surface,

B. placing a second flexible food preparation shape retaining and confining sheet over said first sheet in generally centered registry therewith and with said sheets including corresponding first margins and corresponding second margins opposite said first margins,

C. placing an open frame having a generally planar first side over said second sheet in generally centered registry with said second sheet and with said sheets including corresponding marginal portions clamped between said first side and said surface.

D. spreading a layer of uncooked masa over said second sheet throughout substantially the entire plan area thereof disposed within the boundaries of the inner periphery of said frame,

E. spreading a sauce layer over the masa layer,

F. spreading a quantity of tamale core food mixture over that portion of the sauce layer inward of and adjacent the inner marginal portion of said frame corresponding to said first margins of said sheets,

G. removing said frame,

H. rolling said second sheet, mesa layer, sauce layer and said core food mixture from said first margin of said second sheet toward said opposite margin of said second sheet in order to form a food mixture roll, and

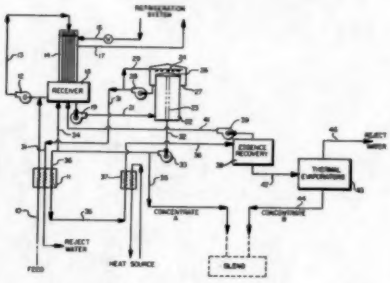
I. wrapping the second sheet and food mixture roll formed in step H in said first sheet.

4,687,671

CONCENTRATION METHOD

Matloob Husain, Wheaton, and Ban-Yen Lai, Willowbrook, both of Ill., assignors to Chicago Bridge & Iron Company, Oak Brook, Ill.

Filed Aug. 19, 1985, Ser. No. 766,972
Int. Cl.[4] A23L *2/12*
U.S. Cl. 426—384 5 Claims



1. A method for concentrating an aqueous liquid mixture containing therein a volatile fraction having a boiling point substantially below that of water, said method comprising the steps of:

A. cooling said mixture sufficiently to cause the production of ice crystals therein;

B. separating said ice crystals from said mixture to produce a first liquid concentrate;

C. dividing said first liquid concentrate into a first stream and a second stream;

D. recovering said first stream as a first concentrated product;

E. separating said volatile fraction from said second stream and recycling said volatile fraction to cooling step A; and

F. thermally concentrating a product remaining in step E after separation of said volatile fraction and recovering a second concentrated product.

4,687,672

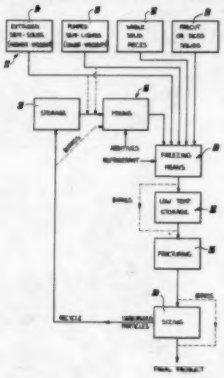
METHOD AND APPARATUS FOR PREPARING FROZEN FREE-FLOWING FOOD PARTICLES

Eugene C. Vitkovsky, Alexandria, Australia, assignor to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Filed Nov. 6, 1984, Ser. No. 668,827
Claims priority, application Australia, Nov. 7, 1983, PG2246
Int. Cl.[4] A23L *3/36*; B02C *23/08*
U.S. Cl. 426—524 2 Claims

1. Process for preparing frozen free-flowing particles of food product, comprising the steps of: extruding a viscous or semi-solid food material through at least one aperture having a diameter comprised between 5 and 50 mm, freezing said extruded food material by direct heat exchange with a cryogenic substance at a temperature sufficiently low to ensure frangibilization and thus freezing to the inner core of said food material,

fracturing the thus-frangibilized said food material to produce free-flowing fractured particles, and sizing the fractured particles to recover particles having a granulometry comprised between 5 and 12 mm.



4,687,673

SWEET GOODS DOUGH FORMING PROCESSES

Meade C. Harris, Jr., Rutherford; David W. Miller, Ridgewood, and Henry E. Arciszewski, Franklin Lakes, all of N.J., assignors to Nabisco Brands, Inc., Parsippany, N.J.

Continuation of Ser. No. 199,448, Oct. 22, 1980, which is a continuation of Ser. No. 641,676, Dec. 17, 1975, abandoned. This application Sep. 17, 1986, Ser. No. 910,293

Int. Cl.[4] A21D *2/00, 10/00;* **A23L** *1/30*

U.S. Cl. 426—549 **15 Claims**

1. A process for forming a high protein content dough which can be used for producing improved nonperishable baked sweet goods having an enhanced sugar structure development which consists essentially of:

(a) mixing water with a quantity of sugar containing sugar solids comprising between 16 and 21 percent by weight of said dough to be formed to substantially saturate the water, at least about 70% of the sugar being sucrose; and

(b) forming a dough by combining the water mixture of step (a) at a temperature of from 40° to about 120° F. with shortening, flour and at least one high protein ingredient, each of said high protein ingredients containing at least 20% protein, and mixing the dough at a temperature between 75° F. and 97° F. and only until uniform distribution of the ingredients throughout the dough is visually apparent, the ratio of total water to sugar solids in said dough being between about 1 to 1.4 and about 1 to 2.6, the total water content in said dough being between about 6 and about 14 percent by weight, the amount of said at least one high protein ingredient being between 13 and 43 percent by weight of said dough to produce baked goods having a protein content of up to about 33 percent, said mixing of the dough being for a time and at a temperature which are insufficient to promote any substantial gluten development, and then forming said dough into pieces, the time lapse between completion of said mixing to baking of said pieces not exceeding 30 minutes and being sufficiently short so as to promote the development of a sugar based structure in said nonperishable baked sweet goods.

4,687,674

CONTINUOUS MIXING PROCESS

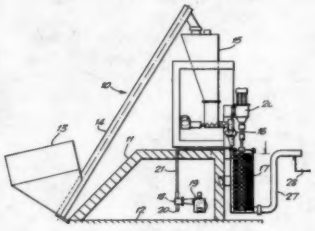
Yngve R. Akesson, Hälsingborg, Sweden, assignor to Nestec S.A., Vevey, Switzerland

Filed May 8, 1985, Ser. No. 732,356

Claims priority, application European Pat. Off., Jul. 28, 1984, 84108982.4

Int. Cl.[4] A21D *10/00*

U.S. Cl. 426—549 **8 Claims**



1. A process for preparing a batter which comprises:

continuously feeding gravimetrically measured quantities of flour and continuously feeding measured quantities of water to a mixing device, which comprises a tube containing a central shaft, a set of a plurality of fingers disposed about an inside wall of the tube along the length of the tube and a set of a plurality of fingers disposed about the shaft along the length of the shaft, wherein at least one set of the fingers is capable of freely moving in a manner which consists essentially of rotating;

mixing the flour and water by rotating at least one of the sets of fingers to form the batter while the flour, water and batter flow by gravity through the tube, the at least one set of the fingers being rotated at a speed sufficient to create a turbulent condition during the mixing operation; and

continuously removing the batter from the mixing device.

4,687,675

METHOD FOR THE PRODUCTION OF ENDOSSEOUS IMPLANTS

Kazuhiko Nakano, Katano, and Keiichirou Watanabe, Toyonaka, both of Japan, assignors to Sumitomo Chemical Company, Osaka, Japan

Filed May 20, 1986, Ser. No. 865,089

Claims priority, application Japan, May 20, 1985, 60-108030

Int. Cl.[4] B05D *1/10*

U.S. Cl. 427—2 **8 Claims**

1. A method for the production of endosseous implants comprising thermally spraying a hydroxyapatite-containing powder to the surface of a metallic core material, and treating the thermally sprayed product with an aqueous solution which does not substantially dissolve the hydroxyapatite but can dissolve calcium oxide to thereby dissolve out the alkaline components from the product.

4,687,676

RUMEN-STABLE PELLETS

Stephen H. Wu, and Mohammad A. Sandhu, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 689,405, Jan. 7, 1985, Pat. No. 4,595,584, which is a continuation of Ser. No. 498,446, May 26, 1983, abandoned, which is a continuation-in-part of Ser. No. 397,314, Jul. 12, 1982, abandoned. This application Apr. 7, 1986, Ser. No. 848,439

Int. Cl.[4] A61K *9/22;* **B02C** *17/00*

U.S. Cl. 427—3 **3 Claims**

1. Method of preparing a composition adapted for use in

coating pellets orally administrable to a ruminant which protects the core material in the rumen and releases it in the abomasum, said composition comprising

(a) from about 16 to about 87% based on the total composition weight of a film-forming polymeric material comprising a polymer, copolymer or mixture thereof, said polymeric material having basic amino groups the nitrogen content of which constitutes between about 2 and about 14% by weight, of the polymeric material,

(b) from about 0.5 to about 32%, based on the total composition weight of a hydrophobic material dispersed in said polymeric material selected from the group consisting of waxes, resins, polymers, fatty acids having from 12 to 32 carbon atoms, aluminum salts of fatty acids having from 12 to 32 carbon atoms and polyfunctional carboxylic acids having a ratio of from 10 to 22 carbon atoms per carboxyl group, and

(c) from about 7 to about 80%, based on the total composition weight, of a physiologically acceptable flake material dispersed in said polymeric material,

said method comprising first mixing said hydrophobic material and said flake material, causing the particles of flake material to come into rubbing contact with said hydrophobic material so that the surface of the particles of flake material become hydrophobic and subsequently blending the resulting mixture of hydrophobic material and flake material with said polymeric material to form said composition.

4,687,677

METHOD AND A DEVICE FOR LINING PIPELINES BY MEANS OF A FLEXIBLE HOSE CONTAINING A CURABLE PLASTIC

Vollmar Jonasson, Lycksele, Sweden, assignor to V-J System AB, Vilhelmina, Sweden

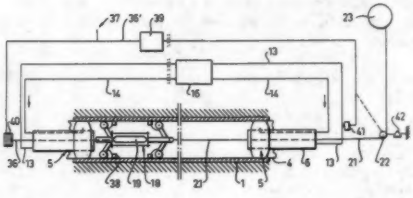
PCT No. PCT/SE84/00126, § 371 Date Dec. 6, 1984, § 102(e) Date Dec. 6, 1984, PCT Pub. No. WO84/03928, PCT Pub. Date Oct. 11, 1984

PCT Filed Apr. 6, 1984, Ser. No. 683,279

Claims priority, application Sweden, Apr. 6, 1983, 8301890

Int. Cl.⁴ B05D *3/02, 3/06;* **B32B** *31/00;* **B05C** *11/00*

U.S. Cl. 427—8 **15 Claims**



1. A method for lining existing pipelines, such as water conduits and sewers positioned in the ground with a flexible hose having a curable plastic material, including introducing the hose into the pipeline to be lined in an uncured state and stabilizing the material in place by curing the curable plastic material, comprising introducing a curing aggregate into the hose and curing the plastic material subsequent to pressing the hose against the pipeline by means of compressed air, exposing the hose to radiation energy from the curing aggregrate containing a radiation source while drawing the aggregrate internally through the hose, simultaneously flowing air through said hose, monitoring temperature of the air flow and adjusting flow of the air dependent on the monitored temperature.

4,687,678

PROCESS FOR PREPARING HIGH TEMPERATURE MATERIALS

Yngve S. Lindblom, Konvaljegatan 6, S-582 46 Linköping, Sweden

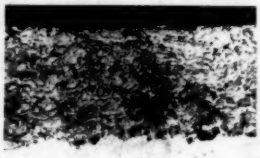
PCT No. PCT/SE85/00148, § 371 Date Nov. 25, 1985, § 102(e) Date Nov. 25, 1985, PCT Pub. No. WO85/04428, PCT Pub. Date Oct. 10, 1985

PCT Filed Mar. 29, 1985, Ser. No. 822,425

Claims priority, application Sweden, Mar. 30, 1984, 8401757

Int. Cl.⁴ B05D *1/08*

U.S. Cl. 427—34 **11 Claims**



1. Process for preparing heat resistant and corrosion resistant materials by coating the material with an alloy of the type MCrAlY, where M is Fe, Ni, Co or NiCo, characterized in that the coating is formed by means of plasma spraying a powder of the alloy metals in the presence of a controlled supply of oxygen and that the plasma sprayed powder comprises an excess of Al and/or Cr and/or Y compared to the final alloy composition, whereby a certain amount of the powder is oxidized so that the resulting coating is of a dual phase structure consisting of a metal phase of the composition MCrAlY and oxide layers which are more or less parallel to the material surface preventing the diffusion of metals or heat in the thickness direction of the layers.

4,687,679

METHOD OF COATING A SUBSTRATE

Harry A. Beale, Columbus, Ohio, assignor to Applied Coatings International, Inc., Columbus, Ohio

Division of Ser. No. 481,140, Apr. 1, 1983. This application Sep. 20, 1985, Ser. No. 778,465

Int. Cl.⁴ B05D *3/06*

U.S. Cl. 427—38 **4 Claims**

1. The method of coating a substrate which comprises combining a vapor of a monomer which upon polymerization would otherwise be clear and transparent with a vapor of silver halide in a partial vacuum to effect plasma polymerization of said monomer and codepositing said silver halide and said plasma-formed polymer on a substrate immersed in said plasma at a rate so that silver halide molecules so deposited from the silver halide vapor will form particles dispersed throughout said polymer of a size smaller than the wave length of white light.

4,687,680

STAMPING FOIL

Hiroshi Narui, Uji, and Terumi Shinohara, Joyo, both of Japan, assignors to Oike Industrial Co., Ltd., Kyoto, Japan

Division of Ser. No. 566,252, Dec. 28, 1983, abandoned. This application Dec. 5, 1985, Ser. No. 805,257

Int. Cl.⁴ B05D *3/06*

U.S. Cl. 427—38 **8 Claims**

1. a method for making a stamping foil comprising:

(a) spreading a flexible supporting web;

(b) applying a transparent and colorless lubricant layer over said flexible supporting web;

(c) applying a colored resinous layer over portions of said lubricant layer;

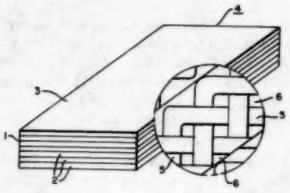
(d) applying a water-soluble coating layer over at least a part of one or both of said lubricant layer and said resinous layer so that the water-soluble coating layer is formed on ares corresponding to subsequent portions to be removed;
(e) depositing a layer of metal over essentially all of the exposed sufaces;
(f) washing the surface with an aqueous solution or water to remove metal coated upon the water-soluble coating layer; and
(g) applying a layer of adhesive over substantially the whole surface.

4,687,681

METHOD OF MAKING A CHEMICALLY BONDED COATING ON A FIBROUS OR FILAMENTOUS SUBSTRATE

John T. Siemon, Indiana Township, Allegheny County, and Rajender K. Sadhir, Plum Boro, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 13, 1985, Ser. No. 701,336
Int. Cl.[4] B05D *3/06*
U.S. Cl. 427—40 **14 Claims**



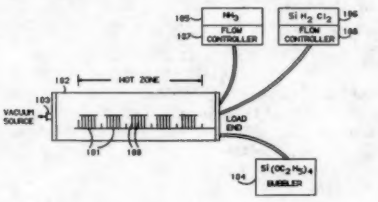
1. A method of forming a coating on an organic polymeric fibrous substrate for use in making a laminate that will exhibit reduced microcracking comprising
(A) applying a liquid which comprises an organic compound that lacks a polymerizable structure and has a vapor pressure of less than 400 mm at room temperature to said substrate;
(B) evaporating any solvent that is present in said liquid; and
(C) exposing said liquid to an ionized non-polymerizing inorganic gas.

4,687,682

BACK SEALING OF SILICON WAFERS

Jeffrey T. Koze, Whitehall, Pa., assignor to American Telephone and Telegraph Company, AT&T Technologies, Inc., Berkeley Heights, N.J.

Filed May 2, 1986, Ser. No. 858,688
Int. Cl.[4] H01L *21/318*
U.S. Cl. 437—238 **14 Claims**



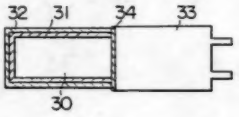
1. A method of making a solid state device by steps comprising capping a back side of a semiconductor wafer in preparation for forming an epitaxial layer of a semiconductor material on the front side of said wafer,
characterized in that said capping is accomplished by steps comprising:
introducing said wafer into a furnace;
increasing the temperature in said furnace while introducing a source gas comprising a silicon compound and a source of oxygen into said furnace, thereby depositing silicon dioxide onto said wafer during said increasing the temperature;
maintaining said furnace at an elevated temperature and introducing a source of silicon and a source of nitrogen into said furnace, thereby depositing silicon nitride onto said silicon dioxide;
and removing said wafer from said furnace.

4,687,683

SCINTILLATOR FOR RADIATION DETECTION AND PROCESS FOR PRODUCING THE SAME

Mitsuru Ishii, Higashiyamato; Seikichi Akiyama, Mito, and Hiroyuki Ishibashi, Hitachi, all of Japan, assignors to Hitachi Chemical Co. Ltd., Tokyo, Japan

Division of Ser. No. 443,034, Nov. 19, 1982, Pat. No. 4,543,485.
This application Aug. 14, 1984, Ser. No. 640,569
Claims priority, application Japan, Nov. 24, 1981, 56-188824; Nov. 24, 1981, 56-188825
Int. Cl.[4] B05B *5/00*; B05D *1/36, 5/06*
U.S. Cl. 427—160 **21 Claims**



1. A process for producing a scintillator for radiation detection which comprises coating a mixture comprising a light reflective material, an organic binder and an organic solvent on the whole surface of a solid scintillator material substrate, other than a surface to be in contact with a light receiver, by a screen printing method, and drying the mixture to give a light reflective material of 50 to 150 μm thick.

4,687,684

PROCESS FOR DIFFUSION COATING METALS

James E. Restall, Frimley, and Cecil Hayman, Rickmansworth, both of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Nov. 22, 1985, Ser. No. 800,809
Claims priority, application United Kingdom, Nov. 29, 1984, 8430129
Int. Cl.[4] C23C *16/06, 16/30*
U.S. Cl. 427—248.1 **20 Claims**

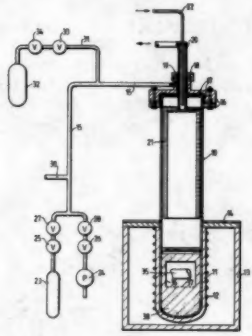
1. A process for producing upon a metal article a diffusion coating enriched with two elements by transporting the two elements singly in consecutive sequence from a source to that metal article without contact therebetween using a halide vapor transport reaction under an inert or a reducing covering atmosphere, wherein the transportation is achieved by essentially the following steps in unbroken sequence:
(i) introducing into a reaction vessel at least one metal article to be diffusion coated and introducing therein also a particulate reaction charge comprising an elemental or compound source for each of said two elements together with a halide activator reactable at a first process temperature with said sources such that a first of said elements generates a substantially greater halide product reaction pressure than does the second of said elements, the particulate reaction charge including a proportion of said halide activator substantially in excess of that required by stoi-

chiometry for complete exhaustion of the source of the first element;

(ii) providing an inert or a reducing atmosphere in the reaction vessel;

(iii) raising the temperature within the reaction vessel to said first process temperature thereby causing transportation of the first element, said transportation producing a net deposition on the metal article of the first element without net deposition of the second element by virtue of the disparity between the pressures of reaction generated in the reactions between the halide activator and the respective first and second elements, and maintaining the first process temperature for so long as transportation of the first element is required;

(iv) terminating the transportation of the first element when



sufficient of such transportation has been achieved, by evacuating the reaction vessel to a degree sufficient to exhaust the source of the first element by evacuation of its halide reaction product;

(v) providing an inert or a reducing atmosphere in the reaction vessel; and,

(vi) adjusting, as necessary, the temperature within the reaction vessel to a second process temperature, identical to or different from said first process temperature, at which second process temperature the source of the second element is reactable with the halide activator in the absence of a source for the first element to generate a vapor product and maintaining this second process temperature to transport the second element to produce a net deposition thereof on the metal article of the second element without net deposition of the first element thereon.

4,687,685

PROCESS FOR IMPREGNATING A PLANAR COMPRESSIBLE CARRIER MATERIAL WITH SYNTHETIC RESIN, AS WELL AS DEVICE FOR WORKING THIS PROCESS

Gerhard Melcher, Vienna, Austria, assignor to Isovolta Oesterreichische Isolierstoffwerke Aktiengesellschaft, Wiener Neudorf, Austria

PCT No. PCT/AT85/00016, § 371 Date Feb. 6, 1986, § 102(e) Date Feb. 6, 1986, PCT Pub. No. WO86/00260, PCT Pub. Date Jan. 16, 1986

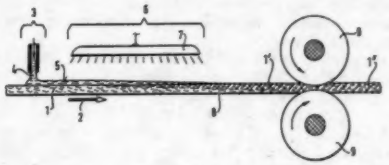
PCT Filed Jun. 24, 1985, Ser. No. 841,867

Claims priority, application Austria, Jun. 22, 1984, 2023/84

Int. Cl.[4] B05D *3/12;* **B05C** *11/00, 3/02;* **B05B** *13/02*

U.S. Cl. 427—366 **13 Claims**

1. A process for impregnating a planar compressible carrier material (1), which has an air permeability according to Gurley in the range of 1.0 to 50 s, with synthetic resin to produce a stackable planar product, wherein to begin with a liquid synthetic resin coating (5) with a synthetic resin content of 70 to 100% and/or with a viscosity at room temperature of 300 to 150,000 mPa.s is applied to one surface of the carrier material (1), whereupon without the application of a mechanical pressure the synthetic resin of the synthetic resin coating (5), which before and/or after its application is raised to a higher temperature, at least partially penetrates into the carrier material (1), and wherein after the synthetic resin of the synthetic resin



coating has to its largest part penetrated into the carrier material, this carrier material (1') is thereupon subjected to such mechanical pressure that the synthetic resin possibly still present as a surface coating penetrates into the carrier material and wherein the synthetic resin evenly permeates the carrier material.

4,687,686

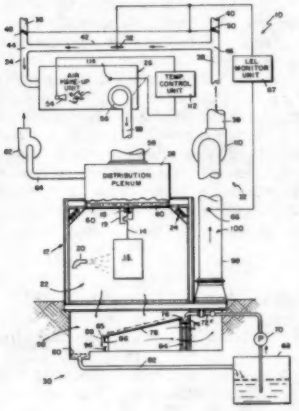
SPRAY BOOTH WITH CLIMATE REGULATION SYSTEM

David F. Stofleth, and James H. Muehlbauer, both of Evansville, Ind., assignors to George Koch Sons, Inc., Evansville, Ind.

Filed Oct. 28, 1985, Ser. No. 792,028

Int. Cl.[4] B05D *1/02*

U.S. Cl. 427—421 **2 Claims**



1. A method of operating a spray booth to regulate the climate in a chamber therein during an initial booth start-up mode and a subsequent booth operation mode in which a moisture-sensitive coating material is sprayed onto an article contained in the booth chamber, the method comprising the steps of

providing an air make-up unit having heater means for selectively heating air in the air make-up unit,

conducting a start-up procedure to ready the climate of the spray booth for article-spraying activities, the start-up procedure comprising the steps of

introducing outside air into the air make-up unit,

selectively activating the heater means in the air make-up unit to control the temperature of the outside air to be introduced into the booth chamber so that the temperature of air in the booth chamber during the booth start-up mode is at least a predetermined minimum temperature

prior to the beginning of an article-spraying activity in the booth chamber,

introducing only outside air supplied by the air make-up unit into the booth chamber,

drawing a contaminated mixture from the booth chamber, the contaminated mixture consisting essentially of newly introduced outside air, solvents or the like, and coating material overspray not applied to an article during a previous spraying activity,

exposing the drawn contaminated mixture to a liquid to decontaminate the drawn contaminated mixture for exhaustion to the atmosphere, and

exhausting the decontaminated mixture to the atmosphere for a selected period of time to cleanse the environment within the booth chamber in accordance with a predetermined specification, and subsequently

conducting a booth operation procedure to provide and substantially maintain the predetermined specified environment in the booth chamber during article-spraying activities to enhance the quality of finish applied to the article, the booth operation procedure comprising the steps of

preventing the introduction of a substantial volume of outside air into the air make-up unit,

conducting the decontaminated mixture to the air make-up unit for recirculation to the booth chamber,

selectively activating the heating means in the air make-up unit to lower the relative humidity of the recirculation air to be introduced into the booth chamber,

introducing only recirculation air supplied by the air make-up unit into the booth chamber,

exhausting contaminated recirculation air from the booth chamber, the contaminated recirculation air consisting essentially of air and coating material overspray,

exposing the contaminated recirculation air to a liquid to decontaminate the contaminated recirculation air for further recirculation to the booth chamber, and

continuing to introduce only the recirculation air into the booth chamber without substantially increasing the volume of air introduced into the booth chamber to regulate the climate in the booth chamber during said spray application, whereby the dewpoint temperature and the relative humidity of the air in the booth chamber are maintained at predetermined levels to reduce condensation on objects contained in the booth chamber and to improve application of the moisture-sensitive coating material to objects contained in the booth chamber.

4,687,687

TRANSPARENT GLAZING PANELS

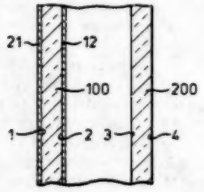
Robert Terneu, Thiméon, and Jean Roucour, Montignies-le-Tilleul, both of Belgium, assignors to Glaverbel, Brussels, Belgium

Filed Mar. 26, 1986, Ser. No. 844,316

Claims priority, application United Kingdom, Mar. 28, 1985, 8508092

Int. Cl.[4] E06B *3/24*

U.S. Cl. 428—34 **12 Claims**



1. A transparent glazing panel comprising at least one sheet of coating glazing material, characterised in that such panel bears on a first sheet face thereof a first light transmitting coating at least 400 nm in thickness which comprises doped tin oxide and/or doped indium oxide and reduces the emissivity of that sheet face in respect of infra-red radiation having wavelengths in excess of 3 μm, and on a second sheet face thereof a second light transmitting metal oxide coating which comprises at least 30% tin and at least 30% titanium calculated as weight percent of the respective dioxide in the second coating, has a thickness of at least 40 nm, and increases the reflectivity of that sheet face in respect of normally incident visible light to at least 20%, while the light absorbing properties of that second coating are such that said second coating has an internal transmission factor in respect of visible light of at least 60% when computed in the manner herein set forth.

4,687,688

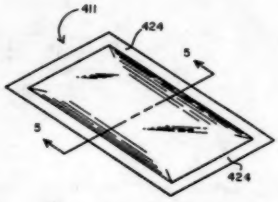
ORIENTED MULTIPLE LAYER FILMS AND BAGS MADE THEREFROM

Kevin J. Curie, and Jerry F. Jesse, both of Neenah, Wis., assignors to American Can Company, Greenwich, Conn.

Filed Feb. 18, 1986, Ser. No. 830,412

Int. Cl.[4] B32B *27/32, 27/34*

U.S. Cl. 428—35 **11 Claims**



1. A three layer polymeric film, said film comprising:

(a) a first oriented layer consisting of nylon 6;

(b) a second layer, the composition of said second layer being a blend of linear low density polyethylene and low density polyethylene, wherein said low density polyethylene is present in said blend composition in an amount up to 50% by weight; and

(c) a third layer of an adhesive polymer, said third layer being between said first and second layers and adhering said first and second layers to each other,

wherein a heat sealed bag made from said three layer film, and having air therein, can be boiled in water without rupture of said bag.

4,687,689

POLYESTER VESSEL HAVING IMPROVED DIMENSION STABILITY AND PROCESS FOR PREPARATION THEREOF

Jinichi Yazaki, Tokyo, and Kozaburo Sakano, Kawasaki, both of Japan, assignors to Toyo Seikan Kaisha, Ltd., Tokyo, Japan

Filed Oct. 16, 1985, Ser. No. 788,212

Claims priority, application Japan, Oct. 16, 1984, 59-215238; Nov. 16, 1984, 59-240510

Int. Cl.[4] B65D *23/08;* **B05D** *3/06*

U.S. Cl. 428—35 **11 Claims**

1. A polyester vessel having an improved heat resistance, which comprises a thermoplastic polyester substrate and a polymerized and crosslinked layer of

(I) at least one crosslinking agent selected from the group consisting of

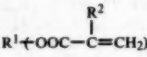
(i) divinyl compounds,

(ii) allyl compounds represented by the following formula:

$$R—OCH_2CH=CH_2)_n$$

wherein R stands for an organic group having a valency of 2 to 4, and n is a number of 2 to 4,

(iii) acrylic compounds represented by the following general formula:

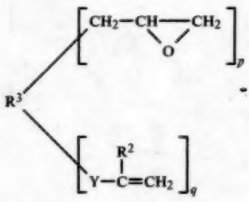


wherein R^1 stands for an organic group having a valency of 2 to 6, R^2 stands for a hydrogen atom or a methyl group, and m is a number of 2 to 6,

(iv) allyl acrylates and allyl methacrylates,

(v) bisacrylamides and bismethacrylamides,

(vi) compounds represented by the following formula:



wherein R^3 stands for an organic group having a valency of p+q, R^2 stands for a hydrogen atom or a methyl group, and p and q are positive integers with the proviso that p is an integer of at least 1 and the sum of p and q is at least 2, and

(vii) prepolymers thereof, or

(2) a combination of the crosslinking agent with a monofunctional monomer, wherein said polymerized and crosslinked layer, in which the molecular chains of the polyester are highly crosslinked with the cross-linking agent, has a thickness of 10 to 30 μm.

4,687,690

METHOD OF AND MEANS FOR FORMING AND SEALING HELICALLY WOUND TUBES

Stanley W. O. Menzel, Burnside, Australia, assignor to Rib Loc Hong Kong Limited, Hong Kong

PCT No. PCT/AU85/00009, § 371 Date Oct. 10, 1985, § 102(e) Date Oct. 10, 1985, PCT Pub. No. WO85/03755, PCT Pub. Date Aug. 29, 1985

PCT Filed Jan. 22, 1985, Ser. No. 796,570

Claims priority, application New Zealand, Feb. 20, 1984, 207,219

Int. Cl.⁴ F16L *9/16*

U.S. Cl. 428—36 **19 Claims**

1. A strip adapted to form a tube by helical winding the strip to have overlapping edge portions and locking the said overlapping edge portions together by a first interengaging member on one face of the strip engaging a second interengaging member on the other face of the strip spaced laterally from the said first member, characterised by a series of ribs positioned longitudinally and upstanding from a base on said strip, cavities in at least some of the said ribs extending longitudinally which open through the base of the said strip, and flaps closing each of the

said cavities, said flaps extending from one edge of the cavity it closes and being secured to the base of the said strip at one edge of cavity, said flaps extending over the said cavities to close the said cavities and disengageably contacting the said base at the sides of the said cavities opposite to the attachment to said base.

4,687,691

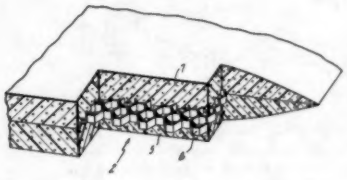
HONEYCOMB SPLICED MULTILAYER FOAM CORE AIRCRAFT COMPOSITE PARTS AND METHOD FOR MAKING SAME

Bruce F. Kay, Milford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Apr. 28, 1986, Ser. No. 856,896

Int. Cl.⁴ B32B *3/26, 31/20*

U.S. Cl. 428—73 **10 Claims**



1. Aircraft composite components, comprising a composite skin surrounding a foam core wherein the improvement comprises:

a. said foam core comprising alternating layers of at least two layers of sheet foam and at least one layer of honeycomb having cells;

b. said honeycomb layer having a greater compressive strength than said layers of sheet foam;

c. said layers of sheet foam having substantially equal compressive strength;

d. said layers of sheet foam in contact with each other at least through each of the honeycomb openings; and

e. said layer of honeycomb cells extending a substantially equal depth into and generally perpendicular to each of said two layers of sheet foam but not penetrating entirely through said sheet foam layers to form a foam-honeycomb-foam sandwich;

wherein the composite component has increased shear strength.

5. A method of making an aircraft composite component comprising joining at least two foam sheets to make a foam core, surrounding the foam core with resin impregnated fibers, and curing said resin impregnated fibers wherein the improvement comprises joining said foam sheets by

a. aligning a layer of honeycomb having cells so that the cells are generally perpendicular to a first layer of sheet foam;

b. applying a compressive force generally perpendicular to

said layer of sheet foam so that the honeycomb cells penetrate said layer of sheet foam;

c. aligning a second layer of sheet foam, having a compressive strength substantially less than said first layer, generally perpendicular so said layer of honeycomb against said honeycomb layer's exposed side; and

d. applying a compressive strength generally perpendicular to at least one layer of sheet foam so that the honeycomb cells penetrate said layers of sheet foam to a depth where said layers of foam contact each other at least through each of the honeycomb openings to form a foam-honeycomb-foam sandwich said honeycomb not in contact with said resin impregnated fibers;

resulting in a composite component that has increased shear strength.

4,687,692

PACKAGING MATERIAL FOR PHOTOSENSITIVE MATERIALS

Mutsuo Akao, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

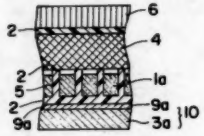
Filed Apr. 11, 1986, Ser. No. 850,744

Claims priority, application Japan, Apr. 15, 1985, 60-55961[U]

The portion of the term of this patent subsequent to May 6, 2003, has been disclaimed.

Int. Cl.[4] B32B *3/10*

U.S. Cl. 428—137 **14 Claims**



1. A laminated film having light shielding properties for packaging photosensitive material comprising:

(a) a perforated thermoplastic film layer, comprising a thermoplastic resin, having a thickness of from 7 to 150 μm and a hole area ratio of from 10 to 90%;

(b) an adhesive layer which penetrates the perforations in the perforated thermoplastic film layer;

(c) a first layer comprising a spun bonded nonwoven fabric on one side of the perforated film layer;

(d) a second layer on the side of the perforated film layer away from the first layer; the first layer and the second layer bonded together by the adhesive through the perforations in the perforated film layer; said second layer being selected from:

(1) a flexible sheet layer comprising a low pressure linear low density polyethylene film layer containing more than 50% by weight of a low-pressure linear low density polyethylene resin in the polyethylene film, and

(2) a flexible metal foil layer having laminated to its surface away from said adhesive, a low pressure linear low density polyethylene film layer containing more than 50% by weight of a low-pressure linear low density polyethylene resin in the polyethylene film.

4,687,693

ADHESIVELY MOUNTABLE DIE ATTACH FILM

Gregory M. Sheyon, and Joseph A. Aurichio, both of Anderson, S.C., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Jun. 13, 1985, Ser. No. 744,352

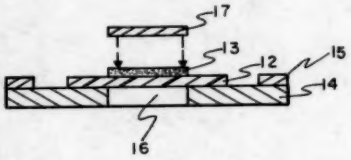
Int. Cl.[4] D06N *7/04*; B32B *3/00*; H01B *17/00*

U.S. Cl. 428—148 **12 Claims**

1. A die attach film adapted for adhesive mounting to a dicing frame, when the frame is brought into contact with the film, which comprises:

(a) a support film;

(b) a curable die bonding adhesive releasably mounted on the support film; and



(c) adhesive means to bond the support film to a dicing frame, said adhesive means comprising a larger tacky film to which the support film carrying the adhesive (b) is bonded.

4,687,694

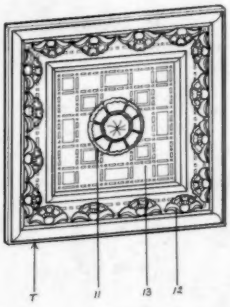
DECORATIVE TILE

Nina M. Kuper, 2520 N. Gordon Ct., Milwaukee, Wis. 53212, and Janis I. Kalnajs, 724 E. Wells, Milwaukee, Wis. 53202

Filed Feb. 13, 1985, Ser. No. 701,073

Int. Cl.[4] B32B *3/30, 13/02*; C04B *31/06, 31/26*

U.S. Cl. 428—156 **7 Claims**



1. A stiff, light-weight, rigid, dimensionally-configured molded construction tile having structural integrity to retain its shape when hung comprising a combination:

(1) gypsum plaster;

(2) chopped glass fiber;

(3) perlite; and

(4) vermiculate;

said construction tile having a density between about 3 and about 25 gm/cubic inch.

4,687,695

FLEXIBLE PRINTED CIRCUITS AND METHODS OF FABRICATING AND FORMING PLATED THRU-HOLES THEREIN

Bill L. Hamby, 1198 Navigator Dr., Ventura, Calif. 93003

Filed Sep. 27, 1985, Ser. No. 780,806

Int. Cl.[4] B32B *23/02*; H05K *1/00*

U.S. Cl. 428—192 **20 Claims**

1. In a flexible printed circuit, the improvement comprising

at least one electrical circuit, at least part of which defines a circuit area and is formed as a patterned electrically conductive layer having first and second opposite surfaces,

a first sheet of flexible electrically insulative material bonded to said first surface of said electircal circuit over a first portion of said circuit area less than the entire circuit area leaving a second portion of said circuit area on said first surface uncovered by said first sheet of flexible material, said first flexible sheet having an edge difining a boundary of said first portion of said circuit area on said first surface,

a second sheet of flexible electrically insulative material bonded to said second surface of said electrical circuit over a third portion of said circuit area less than the entire circuit area leaving a fourth portion of said circuit area on said second surface uncovered by said second sheet of flexible material, said second flexible sheet having an edge defining a boundary of said third portion of said circuit area on said second surface and being bonded to the adjacent surface of said first sheet of flexible material,

a first sheet of rigid printed circuit board substrate bonded to said first surface of said electrical circuit adjacent said first flexible sheet over said second portion of said circuit area, said first rigid sheet having an edge abutting the edge of the adjacent first flexible sheet, and

a second sheet of rigid printed circuit board substrate bonded to said second surface of said electrical circuit adjacent said second flexible sheet over said fourth portion of said circuit area, said second rigid sheet having an edge abutting the edge of the adjacent second flexible sheet, whereby said second and fourth portions of the circuit area of the printed circuit do not include any layers of the first and second flexible sheets therein, thereby facilitating the forming of plated thru-holes in said second and fourth portions of the circuit area by conventional techniques.

4,687,696

FINGER STRIPS FOR COPYING MACHINES

Fuminori Satoji, Kuwana, Japan, assignor to NTN-Rulon Industries Co., Ltd., Tokyo, Japan

Filed Jul. 29, 1985, Ser. No. 759,971

Claims priority, application Japan, Apr. 12, 1985, 60-78699

Int. Cl.[4] B32B *23/02*

U.S. Cl. 428—192 **5 Claims**

1. A finger strip for separating sheets of paper off a fixing roller on a copying machine, said finger strip being made of a heat-resistant resin and having at least a tip portion coated to a thickness of about 40 angstroms to 1 micron with a fluorinated polyether polymer which has as its main structural unit

$$-C_{X1}F_{2X1}-O-$$

wherein X_1 is 1, 2, 3 or 4 said polymer having an average molecular wegiht of 1,000 to 5,000, and having its end linked with at least one polar group.

4,687,697

COMPOSITE HAVING IMPROVED TRANSVERSE STRUCTURAL INTEGRITY AND FLEXIBILITY FOR USE IN HIGH TEMPERATURE ENVIRONMENTS

William H. Cambo, Rollinsford, N.H.; Elliott F. Whitely, Acton, Me., and Leroy E. Bond, Rochester, N.H., assignors to Lydall, Inc., Manchester, Conn.

Filed Sep. 11, 1985, Ser. No. 774,709

Int. Cl.[4] B32B *5/02;* **B01D** *39/06, 27/06*

U.S. Cl. 428—201 **19 Claims**

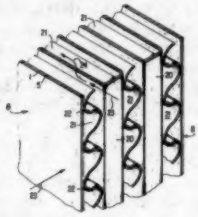
1. A filter useful in high temperature and high transverse stresses filtration, comprising:

(A) a composite having improved structural integrity and flexibility and being composed of:

(1) randomly laid and oriented high temperature resistant inorganic fibers interlocked together into the form of a shape sustaining paper having two lateral surfaces, said paper having a transverse thickness of from about 0.005 to 0.5 inch;

(2) a transverse strength providing high temperature resistant, flexible, woven or non-woven fabric, made of inorganic fibers, and having a weight of from about 0.25 to 10 oz./yd^2, disposed upon at least one of the lateral surfaces of said paper; and

(3) an organic adhesive uniformly applied over the entire surface of one of the paper and the fabric and being disposed between said paper and said fabric in a uniform discontinuous pattern such that no more than 20% of the lateral surface of the finished composite is occupied by the adhesive and the adhesive flexibly and adhesively bonding



said paper and fabric together to form the composite thereof;

(B) mechanical supports means on the low pressure side of the filter and adjacent to the fabric of the composite and spaced-apart no more than 10 inches for resisting high transverse stresses on the composite whereby transverse stresses imposed on the composite during high temperature and high stresses filtration are maintained and the inherent friction between the said fabric and the said paper of the composite caused by said high transverse stresses retains a substantial portion of the transverse structural integrity of the composite after the said adhesive has burned away during said high temperature filtration.

4,687,698

CORROSION PROTECTIVE PRINTING CYLINDER MAKEREADY

David M. Weil; Burton E. Lieberman, both of Chicago, and Ronald F. Adams, Tinley Park, all of Ill., assignors to The Cromwell Paper Company, Chicago, Ill.

Filed Dec. 24, 1984, Ser. No. 685,789

Int. Cl.[4] B32B *3/14, 5/16;* **B41F** *29/08;* **C23C** *16/00*

U.S. Cl. 428—209 **8 Claims**

1. A printing cylinder makeready packing element for an offset printing cylinder comprising a sheet of tympan material disposed for direct contact with the cylinder surface, said sheet having a ferrous metal corrosion inhibiting composition applied to its cylinder contacting surface.

4,687,699

ABRASION-RESISTANT, COPOLYESTER CARRIER FILM FOR MAGNETIC INFORMATION MEDIA

Hartmut Hensel, Schlangenbad, and Hermann Dallmann, Wiesbaden, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Apr. 16, 1985, Ser. No. 723,696

Claims priority, application Fed. Rep. of Germany, Apr. 16, 1984, 3414310

Int. Cl.[4] B32B *31/30, 31/20, 27/36*

U.S. Cl. 428—213 **16 Claims**

1. An abrasion-resistant, multilayer, biaxially oriented carrier film for magnetic information media, comprising

(i) a polyester substrate layer having from 0.001 weight percent to 10 weight percent, based upon the weight of the polyester forming said substrate layer, of solid parti-

cles having an average particle size of from 0.001 to 20 microns, said particles being finely distributed throughout said substrate layer; and

(ii) a cover layer applied to each of the two surfaces of said polyester substrate, said cover layer being a copolyester cover layer having a maximum thickness of 40% of the thickness of said polyester substrate.

4,687,700

ABRASION-RESISTANT POLYESTER CARRIER FILM FOR MAGNETIC INFORMATION MEDIA

Hartmut Hensel, Schlangenbad, and Hermann Dallmann, Wiesbaden, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Apr. 16, 1985, Ser. No. 723,700

Claims priority, application Fed. Rep. of Germany, Apr. 16, 1984, 3414347

Int. Cl.[4] B32B *31/30, 31/20, 27/36*

U.S. Cl. 428—213 **16 Claims**

1. An abrasion-resistant, multilayer, biaxially oriented carrier film for magnetic information media, comprising

(i) a polyester substrate layer having from 0.001 weight percent to 10 weight percent, based upon the weight of the polyester forming said substrate layer, of solid particles having an average particle size of from 0.3 to 20 microns, said particles being finely distributed throughout said substrate layer; and

(ii) a cover layer applied to each of the two surfaces of said polyester substrate, said cover layer being a homopolyester cover layer having a maximum thickness of 40% of the thickness of said polyester substrate.

4,687,701

HEAT SENSITIVE INKED ELEMENT FOR HIGH SPEED THERMAL PRINTERS

Franco Knirsch, Banchette, and Giovanni Gianolini, Lozza, both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Italy

Filed Mar. 28, 1984, Ser. No. 594,273

Claims priority, application Italy, Mar. 30, 1983, 67352 A/83

Int. Cl.[4] B32B *7/02;* **C09J** *7/02*

U.S. Cl. 428—216 **7 Claims**

1. A heat-sensitive inked element for high-speed dot printing machine comprising a plastics material base carrier having a thickness of from about 5 to about 15 microns covered on one side with a dried adherent layer having a thickness of from about 2 to about 6 microns, said layer formed of a mixture which is transferable to a printing carrier when subjected to heat and pressure, the mixture comprising a pigment and/or colouring agent and a binder consisting of a blend of 53 to 60 percent by weight thermoplastic resins selected from the group consisting of alicyclic, colophane and rosin based non-polymeric resins and correspondingly 47 to 40 percent by weight of a wax selected from the group consisting of natural waxes, synthetic waxes and mixtures thereof with a melting point of between 60° and 80° C., wherein the resins and wax are selected so as to be compatible with each other and to provide a melting point for said mixture of between 60° C. and 80° C. and a melt viscosity for said mixture of between 50 and 1,000 cps, said layer being capable of adhering to any printing paper having a roughness between 10 and 100 mil/min by applying a thermal energy not higher than about 10 joule/cm^2 and of giving a good quality of printed dots with a definition of up to 10 dot/mm and a printing feed movement of up to 20 cm/sec.

4,687,702

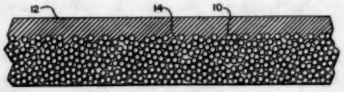
STRUCTURAL INSULATING PANEL AND METHOD OF MAKING THE PANEL

John C. Monsees, El Cajon, Calif., assignor to Chemtronics, El Cajon, Calif.

Filed Jun. 20, 1986, Ser. No. 877,006

Int. Cl.[4] B32B *5/14, 3/26, 15/08;* **B05D** *3/02*

U.S. Cl. 428—308.4 **16 Claims**



1. A structural insulating panel comprising:

a polyimide foam sheet having surface discontinuities or interstices extending into the foam surface and constituting at least about 1 percent of the foam surface area; and

a layer of metal on at least one foam surface having a substantially planar outer surface and extending into said discontinuities and interstices with the area in a plane parallel to the foam surface at a depth of from about 0.03 to 0.50 inch being substantially 50% metal and 50% polyimide;

whereby said metal layer is very firmly adhesively and mechanically bonded to said foam and has a three-dimensional structure within the foam providing improved structural strength.

4,687,703

MAGNETIC RECORDING MEDIUM

Takahito Miyoshi, and Masaaki Fujiyama, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 13, 1986, Ser. No. 874,185

Claims priority, application Japan, Jun. 17, 1985, 60-131478

Int. Cl.[4] G11B *5/708, 5/714*

U.S. Cl. 428—323 **6 Claims**

1. A magnetic recording medium comprising a non-magnetic support having coated thereon a magnetic layer, wherein the magnetic layer contains (i) ferromagnetic alloy particles having a specific surface area (SBET) of 48 m^2/g or more and (ii) inorganic particles having an average particle size of 0.2 μm or less and having a Mohs' hardness of 6 or more in an amount of 10 to 30 wt % based on the total weight of ferromagnetic alloy particles.

4,687,704

MAGNETIC RECORDING MEDIUM

Takahito Miyoshi; Akihiro Matsufuji; Nobuyuki Yamamoto; Hajime Miyatsuka, and Masaaki Fujiyama, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Filed Jan. 15, 1986, Ser. No. 819,061

Claims priority, application Japan, Jan. 17, 1985, 60-7282

Int. Cl.[4] G11B *5/68, 5/708*

U.S. Cl. 428—328 **6 Claims**

1. A magnetic recording medium comprising a nonmagnetic support and a magnetic recording layer, said magnetic recording layer comprising a ferromagnetic metal powder having a specific surface area of not less than 42 m^2/g and an inorganic material powder having a Mohs' scale hardness of not less than 8, wherein at least 90 wt. % of said inorganic material powder consists of particles having a particle size of 0.1–0.6 μm, a 55–80 wt. % portion of said particles consisting of particles having a particle size of less than 0.3 μm, and the residual portion consisting of particles having a particle size of not less than 0.3 μm.

4,687,705

MAGNETIC RECORDING MEDIUM

Hajime Miyatsuka; Akira Kasuga; Akihiro Matsufuji, and Takeshi Kakuta, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 8, 1985, Ser. No. 731,806

Claims priority, application Japan, May 8, 1984, 59-90128; Jun. 11, 1984, 59-118093

Int. Cl.[4] G11B *5/702*

U.S. Cl. 428—329 11 Claims

1. A magnetic recording medium comprising a non-magnetic support having provided thereon a magnetic layer containing ferromagnetic metal particles and a binder which has essentially no functional groups which adsorb onto the ferromagnetic metal particles, wherein the ferromagnetic metal particles have a specific area of 30 m^2/g or more, a saturation magnetization of 120 emu/g or more and have been surface-treated with an organic compound in an amount of from 0.2 to 20 weight percent based on the weight of the ferromagnetic particles, the amount of the essentially no functional groups in the binder being 0.03 weight percent or less based on the total amount of the binder, said ferromagnetic particles having been surface-treated prior to being added to the binder.

4,687,706

MAGNETIC RECORDING MEDIUM

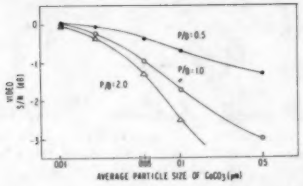
Takahito Miyoshi; Toshimitu Okutsu, and Masaaki Fujiyama, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 11, 1984, Ser. No. 599,117

Claims priority, application Japan, Apr. 11, 1983, 58-63411

Int. Cl.[4] G11B *5/72*

U.S. Cl. 428—330 10 Claims



1. A magnetic recording medium comprising a non-magnetic support having a magnetic recording layer on one surface thereof, and a backing layer on the surface opposite the magnetic recording layer, said backing layer containing calcium carbonate particles having an average particle size of 0.005 μm to 0.01 μm dispersed in a binder, wherein said calcium carbonate particles have a Mohs hardness of 3 to 7 and wherein the backing layer has a thickness of 0.3 to 1.5μ.

4,687,707

LOW REFLECTANCE TRANSPARENT MATERIAL HAVING ANTISOILING PROPERTIES

Masashi Matsuo; Nobuyuki Yamagishi; Makoto Noshiro, all of Yokohama; Yukio Jitsugiri, Yokosuka, and Keiichi Ohnishi, Yokohama, all of Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

Continuation of Ser. No. 746,406, Jun. 19, 1985, abandoned. This application Dec. 5, 1986, Ser. No. 939,296

Claims priority, application Japan, Jun. 26, 1984, 59-129992; Mar. 19, 1985, 60-53317; Apr. 19, 1985, 60-82169

Int. Cl.[4] B32B *27/06*

U.S. Cl. 428—336 9 Claims

1. A low reflectance transparent material having antisoiling properties, which comprises a transparent substrate and a multi-layer coating formed on the substrate, said coating comprising at least one thin layer of a condensation product containing a metal oxide, and a thin layer of a condensation product of a fluorine-containing silicon compound having a perfluorocarbon chain containing from 3 to 20 carbon atoms, formed thereon.

4,687,708

HIGH BUILD FLUOROCARBON POLYMER DISPERSIONS AND THEIR PREPARATION

Kenneth Batzar, Cherry Hill, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 26, 1986, Ser. No. 878,830

Int. Cl.[4] B32B *27/28;* B05D *3/02;* C08K *3/08*

U.S. Cl. 428—339 6 Claims

3. An aqueous dispersion of 20 to 60 wt. % of a melt processible, substantially non-elastomeric copolymer of 80 to 99.5 mole percent tetrafluoroethylene and 0.5 to 20 mole percent perfluoro(n-propyl vinyl ether) having a particle size of from 5 to 100 micron, which has been fluorinated to where there are less than 80 unstable end groups per 10^6 carbon atoms.

4. A process comprising applying successive bubble free layers of the dispersion of claim 3 to a substrate and thermally curing each layer prior to applying the next layer.

6. A coated article prepared by the process of claim 4 wherein the coating is at least 25 mils in thickness.

4,687,709

MAGNETIC RECORDING CARRIER CONTAINING RADIATION HARDENABLE DISPERSING AGENTS

Hermann Brinkmeyer, Krefeld; Gerhard Hübler, Munich; Hermann Perrey, Krefeld; Burkhard Nippe, Munich, and Heinrich Kober, Hohenschaeftlarn, both of Fed. Rep. of Germany, assignors to Agfa Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Oct. 6, 1986, Ser. No. 915,783

Claims priority, application Fed. Rep. of Germany, Oct. 19, 1985, 3537258

Int. Cl.[4] H01F *10/02*

U.S. Cl. 428—425.9 10 Claims

1. Radiation hardenable magnetic recording carrier consisting of a non-magnetic layer support and a magnetic layer containing pigments, binders, other additives and radiation hardenable dispersing agents based on ethylenically unsaturated phosphoric acid ester mixtures on the front of the layer support and optionally a non-magnetizable layer containing binder on the back of the layer support, which layer contains further additives and radiation hardenable dispersing agents based on ethylenically unsaturated phosphoric acid ester mixtures, characterised in that the phosphoric acid ester mixtures used as dispersing agents are capable of forming betaine type structures and are reaction products of

A. 1–2.5 OH equivalents of a (meth)acrylic acid ester and/or oligo(meth)acrylate containing one hydroxyl group per molecule,

B. 1–2.5 OH equivalents of a saturated and/or ethylenically unsaturated tertiary alkylamine containing 1 hydroxyl group per molecule and

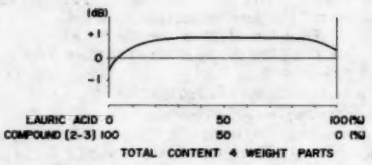
C. 1 mol of phosphorus pentoxide or 1 mol of phosphorus pentoxide equivalent,

in which the sum of OH equivalents from A and B amount to at least 3–4 and the reaction products have an acid number (mg KOH/g of substance) of less than 200, preferably less than 150, in particular less than 100 and are optionally neutralised with a base.

4,687,710
MAGNETIC RECORDING MEDIUM

Hiroshi Ogawa; Shinji Saito; Chiaki Mizuno, and Yasuo Tamai, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Continuation of Ser. No. 790,193, Oct. 22, 1985, abandoned. This application Aug. 18, 1986, Ser. No. 898,746
Claims priority, application Japan, Oct. 23, 1984, 59-222754
Int. Cl.[4] G11B *5/704, 5/71*
U.S. Cl. 428—447 14 Claims

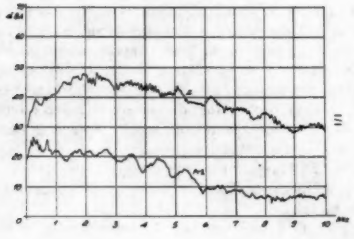


1. A magnetic recording medium comprising a non-magnetic support and a magnetic recording layer provided on said support, said magnetic recording layer comprising a ferromagnetic powder dispersed in a binder, which is characterized in that said nonmagnetic support has heat shrinkage ratio of not higher than 1.0% at 110° C. for 4 hours under application of no tension and said magnetic recording layer comprises at least one fatty acid having 12 to 22 carbon atoms and at least one modified silicon compound having a molecular weight of not less than 200, wherein the total amount of said fatty acid and said modified silicon compound in the magnetic recording layer is in the range of 0.5 to 10 parts by weight per 100 parts by weight of the ferromagnetic powder and wherein said magnetic recording layer contains the fatty acid and the modified silicon compound in a weight ratio of 9/1 to 1/9.

4,687,711
SILENT FILM FOR OSTOMY POUCHES

Paolo Vietto, Legnano, and Francesco Martini, Rho, both of Italy, assignors to W. R. Grace & Co., Cryovac Div., Duncan, S.C.

Continuation of Ser. No. 587,102, Mar. 7, 1984, abandoned. This application Feb. 6, 1986, Ser. No. 825,969
Claims priority, application Italy, May 13, 1983, 21109 A/83
Int. Cl.[4] C08L *23/16*
U.S. Cl. 428—515 4 Claims



1. A multilayer film from which ostomy pouches or the like having a high degree of silence and pliability may be constructed comprising:

(a) a barrier layer selected from the group consisting of copolymers of vinylidene chloride and copolymers of ethylene-vinyl alcohol;

(b) two outer layers with the barrier layer disposed therebetween, each outer layer comprising a blend of:

(i) 60% to 40% by weight of an elastomeric polyolefin alloy consisting essentially of:

(1) 20% to 40% by weight of an elastomeric ethylene-propylene copolymer, said copolymer having an ethylene content of 55% to 70% by weight;

(2) 70% to 35% by weigh of a thermoplastic, film forming, ethylenevinyl acetate copolymer having a vinyl acetate content of less than than about 20%; and

(3) 10% to 30% by weight of said alloy comprising machinability and fabricability promoting agents; and

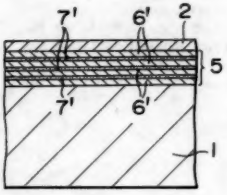
(ii) 40% to 60% of a thermoplastic, film forming ethylene-vinyl acetate copolymer having a vinyl-acetate content of less than about 20% by weight; and

(c) said multilayer film being coextruded and hot blown.

4,687,712
VERTICAL MAGNETIC RECORDING MEDIUM

Ryuji Sugita, Hirakata; Kazuyoshi Honda, Takatsuki; Hiroshi Nishida, Takaishi, and Kyoji Noda, Kumamoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 4, 1984, Ser. No. 678,040
Claims priority, application Japan, Dec. 12, 1983, 58-233841; Dec. 27, 1983, 58-251093
Int. Cl.[4] G11B *5/66*
U.S. Cl. 428—611 32 Claims



1. A vertical magnetization recording medium comprising a non-magnetic substrate, a permalloy film formed on the non-magnetic substrate said permalloy film consisting of a plurality of permalloy layers separated by at least one first non-magnetic layer placed therein, each of said plurality of permalloy layers being 2000 Å or less thick, and a vertical magnetization film formed on the permalloy film by one of: direct formation on the permalloy film, and formation on the permalloy film through a second non-magnetic layer.

4,687,713
TIN-FREE STEEL STRIPS USEFUL IN THE MANUFACTURE OF WELDED CANS AND PROCESS FOR MAKING

Hajime Ogata; Hisatada Nakakouji; Yasuhiro Akeda; Toshio Ichida; Toshio Irie, and Sachiko Otsuka, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

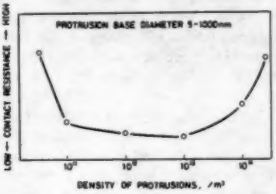
Filed Mar. 14, 1986, Ser. No. 842,521
Claims priority, application Japan, Mar. 15, 1985, 60-52935; Jun. 8, 1985, 60-124847
Int. Cl.[4] B32B *15/04*
U.S. Cl. 428—628 2 Claims

2. A process for producing a tin-free steel strip useful in the manufacture of welded cans, comprising a steel strip having a surface, a metallic chromium layer formed on the steel surface to a weight of 40 to 150 mg/m^2, and a chromium compound containing layer formed on the metallic chromium layer to a weight of 5 to 25 mg/m^2, wherein the metallic chromium layer has 1×10^{11} to 1×10^{14} protrusions per square meter on its surface adjoining the chromium compound containing layer, said protrusions having a diameter of 5 to 1000 nm at the base thereof, said process comprising the steps of

chromium plating a cold rolled steel strip in an aqueous

solution containing hexavalent chromium ions to a weight of 40 to 140 mg/m^2 of metallic chromium,

subjecting the chromium plated strip to an electrolytic treatment at an electricity quantity of 0.1 to 10 C/dm^2 with the strip being made anode, and



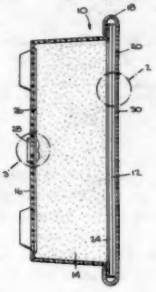
subjecting the strip to a cathodic treatment in an aqueous solution containing a chromium plating aid and hexavalent chromium ions so as to deposit an additional metallic chromium layer in a weight of 10 to 60 mg/m^2.

4,687,714

CASE FOR METAL/AIR ELECTROCHEMICAL CELLS, AND CELLS AND LANTERN BATTERIES THEREOF

John E. Oltman, Mt. Horeb, and Gerald F. Sanden, Verona, both of Wis., assignors to Rayovac Corporation, Madison, Wis.

Filed Feb. 4, 1986, Ser. No. 826,130
Int. Cl.^{4} H01M *12/04*
U.S. Cl. 429—27 **25 Claims**



1. A case for enclosing a metal anode, air cathode, and electrolyte of a metal/air electrochemical cell, which comprises: a nonconductive container which is comprised of a thermoplastic, electrolyte-resistant material which is sufficiently flexible to accomodate the growth of anodic material during discharge, and a multi-functional metallic cover secured to the container which has means for providing ingress of oxygen to the air cathode, the cover being sufficiently rigid to prevent distortion of the air cathode during discharge and functioning as the positive terminal of the cell.

4,687,715

ZIRCONIUM PYROPHOSPHATE MATRIX LAYER FOR ELECTROLYTE IN A FUEL CELL

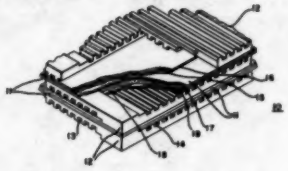
Norman Michael, Penn Hills, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 26, 1985, Ser. No. 759,383
Int. Cl.^{4} H01M *8/02*
U.S. Cl. 429—41 **21 Claims**

1. A fuel cell comprising:

(a) a pair of spaced apart electrodes;

(b) a porous electrolyte retaining matrix layer disposed between the electrodes, said matrix layer comprising



particles of a zirconium compound, wherein the zirconium compound consists essentially of ZrP_2O_7; and

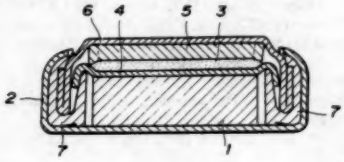
(c) electrolyte contained within the matrix layer.

4,687,716

ORGANIC ELECTROLYTE CELL

Toru Nagaura, Koriyama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jul. 31, 1986, Ser. No. 891,152
Claims priority, application Japan, Jul. 31, 1985, 60-169215
Int. Cl.^{4} H01M *2/16*
U.S. Cl. 429—145 **4 Claims**



1. An organic electrolyte cell comprising:

an anode mainly formed of lithium;

a cathode;

an organic electrolyte;

a layer of powder material holding said organic electrolyte therein;

a micro porous film adjacently provided to said layer of powder material having a plurality of micro size pores permitting of ions of said organic electrolyte to pass therethrough;

said layer of powder material and said micro porous film being provided adjacently between said anode and said cathode.

4,687,717

BIPOLAR BATTERY WITH ARRAY OF SEALED CELLS

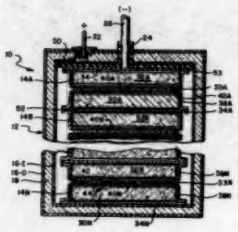
Thomas D. Kaun, New Lenox, and John A. Smaga, Lemont, both of Ill., assignors to The United States of America as represent by the United States Department of Energy, Washington, D.C.

Filed Jul. 8, 1986, Ser. No. 883,216
Int. Cl.^{4} H01M *6/48*
U.S. Cl. 429—152 **9 Claims**

1. A bipolar battery comprising a plurality of individual cells with electrode faces in a face-to-face stacked array with electrically opposite electrode ends and electrically conductive end face caps in contact with said electrode ends of the array, each cell including a pair of electrically opposite electrodes in contact with and separated by a central separator containing an electrolyte normally fluid during operation of the battery, the array including a current collector sheet between and in electrical contact with adjacent electrodes of adjacent cells,

means for isolating each cell from adjacent cells including a pair of cup-like metallic electrode holders with perforated and facing closed ends in a spaced apart arrangement to enclose the electrodes of said cell with the perforations of

each holder permitting an electrode-electrolyte interface for ionic transport, each holder having side walls forming an open end attached in a sealing engagement with an adjacent current collector sheet or end face cap, and an insulating member between and in sealing engagement



with the adjacent perforated closed ends to enclose the electrolyte and perforations, and

a housing enclosing the array with means for external electrical connection to the electrically opposite ends of the array.

4,687,718

METHOD OF MAKING A SEALED LEAD-ACID BATTERY WITH A GEL ELECTROLYTE AND SEALED LEAD-ACID STORAGE BATTERY MADE ACCORDING TO THIS METHOD

Augustus M. Chreitzberg, Yardley, and Frank J. Chiacchio, Bensalem, both of Pa., assignors to Exide Corporation, Horsham, Pa.

Filed Oct. 24, 1986, Ser. No. 923,104

Int. Cl.[4] H01M *10/12*

U.S. Cl. 429—190 **7 Claims**

1. A method of making a sealed lead-acid storage battery having a plurality of electrodes and a gel electrolyte consisting substantially of sulfuric acid and a gelling agent, comprising the steps of:

(a) activating a dry unformed battery by filling the battery with sulfuric acid,

(b) maintaining the battery on open circuit for a period of time sufficient to chemically bond sulphuric acid as sulfate to the electrodes and lower the specific gravity of the acid to the desired gelling value,

(c) dumping the free acid from the battery,

(d) adding a solution of gelling agent and sulfuric acid to fill the battery to the normal formation level,

(e) formation charging the battery by applying a constant charge current of 5–16 A/100 Ah for an input of 200–300 Ah/lb. positive active material whereby gelling of the electrolyte is effected,

(f) when formation is complete, removing excess liquid, if any, to top of electrodes, and

(g) sealing the battery with a pressure relief valve.

4,687,719

METALLIZED SYNTHETIC RESIN FIBER ELECTRODE STRUCTURE BASED ON NONWOVEN FABRIC FOR BATTERY ELECTRODES

Klaus Von Benda, Nuertingen, and Claus Schneider, Fellbach, both of Fed. Rep. of Germany, assignors to Deutsche Automobilgesellschaft mbH, Hannover, Fed. Rep. of Germany

Filed May 16, 1984, Ser. No. 610,779

Claims priority, application Fed. Rep. of Germany, May 21, 1983, 3318629

Int. Cl.[4] H01M *4/72, 4/80*

U.S. Cl. 429—234 **14 Claims**

1. A metallized synthetic resin fiber electrode structure having a relatively large internal surface area made from a nonwoven metallized fleece-like fabric of synthetic resin fibers, in which the electrode structure has a porosity of 85–96% and a fiber thickness of 10–30 μm, as measured in nonmetallized condition of the fibers, characterized in that to achieve an electrode structure which is mechanically rugged, has good dimensional stability and offers readily reproducible values, the quotient of flexural stiffness, according to DIN 53 362, by a cantilever test and of the square of nonwoven fabric thickness according to DIN 53 855, ranges in the non-woven fabric in its non-metallized condition between 800 and 400 cN; the deformation of a sample stack in the 5th cycle under 200N in a compression test according to DIN 54 305 amounts to 6–18 mm; and in that the force required to obtain half the deformation amounts to 30–70N so that the metallized synthetic resin fiber electrode structure offers a relatively high strength without the need for a metallic support or for sintering and minimizes reproducibility and dimensional stability problems coupled with improved lifetimes in cyclic operation.

4,687,720

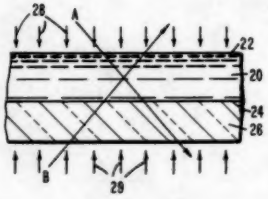
SIDE LOBE SUPPRESSION IN HOLOGRAMS USING PRE-EXPOSURE

John E. Wreede, Monrovia, and James A. Arns, Culver City, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 21, 1984, Ser. No. 684,645

Int. Cl.[4] G03C *1/66, 5/02;* **G03H** *1/06*

U.S. Cl. 430—2 **13 Claims**



1. Method of making a hologram having an efficiency curve with substantially reduced side lobes comprising:

preparing a thin layer of holographic recording medium having opposed surfaces;

exposing said surfaces of the layer to filtered incoherent light in a manner to produce a sensitivity profile therein which is substantially zero at said surfaces and increases substantially continuously to a maximum in the vicinity of the center of the layer; and

exposing said layer having said sensitivity profile to coherent light beams to record a hologram fringe pattern therein.

4,687,721

ELECTROPHOTOGRAPHIC PHOTORECEPTOR CONTAINING A TRISAZO COMPOUND

Kazuhiro Emoto; Akira Itoh, and Kozo Haino, all of Nagaokakyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

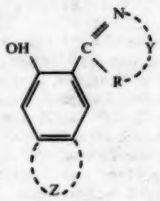
Filed Sep. 10, 1986, Ser. No. 905,450

Claims priority, application Japan, Dec. 13, 1985, 60-280425

Int. Cl.[4] G03G *5/06, 5/14*

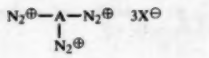
U.S. Cl. 430—58 **15 Claims**

1. An electrophotographic photoreceptor comprising an electroconductive support and, provided thereon, a photosensitive layer containing (A) a trisazo pigment formed by the reaction between a coupler component represented by the following general formula (I) and a diazonium salt represented by the following general formula (II) or (B) a bisazo pigment represented by the following general formula (III):



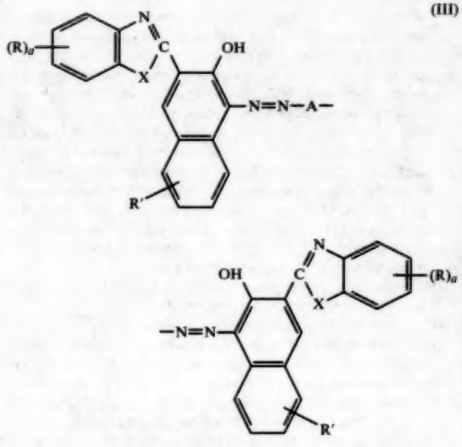
(I)

wherein Z is a substituted or unsubstituted hydrocarbon ring or a group of atoms necessary to complete a substituted or unsubstituted hetero ring, R is oxygen, sulfur, or —NR′—, Y is a chain hydrocarbon necessary to complete a 5- or 6-membered ring, and R′ is hydrogen or an alkyl, benzyl, or aryl group which may have a substituent;



(II)

wherein A is a trivalent moiety whose carbon atom is bonded to nitrogen atom forming azo group and $X^{\ominus}$ is an anionic functional group;



(III)

wherein A is a divalent moiety whose carbon atom is bonded to nitrogen atom forming azo group, R's which may be the same or different are each hydrogen, methyl, ethyl, nitro, or halogen, R′ is hydrogen or halogen, X is —O—, —S—, or —NH—, and a is an integer of 1 or 2.

4,687,722

IMAGE HOLDER MEMBER WITH OVERLAYER OF AMORPHOUS SI WITH H AND C

Kyosuke Ogawa, Sakurashin, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 634,436, Jul. 26, 1984, abandoned. This application Dec. 23, 1986, Ser. No. 946,092

Claims priority, application Japan, Aug. 3, 1983, 58-142208

Int. Cl.[4] G03G 5/14

U.S. Cl. 430—59 **30 Claims**

1. An image holding member which comprises a photosensitive layer of a laminate structure comprising a charge generation layer and a charge transport layer wherein at least one of the charge generation layer or the charge transport layer contains an organic material and an amorphous film containing at least silicon atom, hydrogen atom and carbon atom as main components overlying the photosensitive layer, wherein the amorphous film is formed by discharge in a gaseous atmosphere of organohydrogenosilane and wherein the organohydrogenosilane is a compound of the following general formula (I),

$$R_m—Si_nH_{2n+2-m} \quad (I)$$

where R is alkyl or aryl which may be substituted, m is an integer of 1–15 and n is an integer of 1–7 provided that m and n satisfy the relation $2n+2>m$.

4,687,723

ELECTROPHOTOGRAPHIC PHOTOCONDUCTOR HAVING A PHOTOSENSITIVE LAYER OF AMORPHOUS SILICON CARBONITRIDE

Kohichi Ohshima; Yoshiyuki Kageyama, both of Numazu; Yukio Ide, Mishima; Itaru Fujimura, Numazu, and Masako Kunita, Fuji, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 676,806, Nov. 30, 1984, abandoned. This application Dec. 17, 1985, Ser. No. 821,832

Claims priority, application Japan, Dec. 1, 1983, 58-225395

Int. Cl.[4] G03G 5/082

U.S. Cl. 430—65 **17 Claims**

1. An electrophotographic photoconductor comprising a support material, an intermediate layer formed on said support material, a photosensitive layer formed on said intermediate layer, and a surface protection layer formed on said photosensitive layer for protecting the surface of said photosensitive layer and for reducing the reflection by said photosensitive layer of the light incident thereon, said photosensitive layer comprising an amorphous silicon carbon nitride selected from the group consisting of an amorphous silicon carbon nitride containing at least one hydrogen or halogen having the formula of a-Si:C:N(H.X), where X represents halogen, and an amorphous silicon carbon nitride of the formula of a-Si:C:N:O(H.X), where X represents halogen, which contains at least hydrogen or halogen, and said intermediate layer comprising a material selected from the group consisting of a-Si:N:H, a-Si:N:O:H, a-Si:C:O:H, a-Si:C:N:O:H, B:N:H, B:N:O:H, B:C:N:H, a-Si:n:X, a-Si:N:O:X, a-Si:C:O:X, a-Si:C:X, a-Si:C:N:O:X, B:N:X, B:N:O:X and B:C:N:X, where X is halogen.

4,687,724

PHOTORECEPTOR FOR ELECTROPHOTOGRAPHY COMPRISING BORON DOPED A-$SI_{1-x}N_x$:H:F

Shaw Ehara, Tenri; Yoshimi Kojima; Eiji Imada, both of Nara; Takashi Hayakawa, and Toshiro Matsuyama, both of Tenri, all of Japan, assignors to Sharp Kabushiki, Osaka, Japan

Filed Dec. 14, 1983, Ser. No. 561,349

Claims priority, application Japan, Dec. 16, 1982, 57-221642

Int. Cl.[4] G03G 5/082

U.S. Cl. 430—84 **20 Claims**

1. A photoreceptor for electrophotography comprising a substrate of conductor and a single layer of amorphous silicon film formed on the substrate, said amorphous silicon of said film being composed of a-$Si_{1-x}N_x$ containing nitrogen and boron doped to said a-$Si_{1-x}N_x$, in which the silicon dangling bonds are terminated with hydrogen and fluorine.

4,687,725

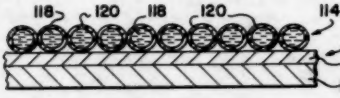
METHOD FOR FORMING RELIEF IMAGES AND PHOTOSENSITIVE MATERIAL USEFUL THEREIN

Richard F. Wright, Dayton; Paul C. Adair, Springboro, and Frederick W. Sanders, Chillicothe, all of Ohio, assignors to The Mead Corporation, Dayton, Ohio

Filed Oct. 25, 1985, Ser. No. 791,801

Int. Cl.[4] G03C 1/495, 1/68; G03F 7/26

U.S. Cl. 430—138 26 Claims



1. A method for forming relief images comprising:

image-wise exposing a layer of microcapsules to actinic radiation, said microcapsules having discrete capsule walls and containing a photosensitive composition which undergoes a change in viscosity in areas exposed to actinic radiation, said layer of microcapsules being present on a support having an etchable surface or on a separate carrier sheet,

subjecting said layer of microcapsules to a uniform rupturing force such that said microcapsules rupture and image-wise release said photosensitive composition to said etchable surface,

applying an etching agent to said etchable surface, said agent thereupon differentially etching said surface,

and washing said support.

4,687,726

PHOTOSENSITIVE RECORDING MATERIAL FOR USE IN THE PRODUCTION OF NEGATIVE-WORKING PLANOGRAPHIC PRINTING PLATES WITH DIAZONIUM POLYCONDENSATE AND INORGANIC PIGMENT

Gunter Schlögl, Kelkheim; Gerhard Mack, Wiesbaden, both of Fed. Rep. of Germany, and Manfred Michel, Suzano, Brazil, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed May 8, 1985, Ser. No. 731,778

Claims priority, application Fed. Rep. of Germany, May 12, 1984, 3417645

Int. Cl.[4] G03C 1/60, 1/76

U.S. Cl. 430—175 10 Claims

1. A photosensitive recording material for use in the production of planographic printing plates, comprising a support and a negative-working photosensitive layer which is provided on said support, which has a thickness ranging from about 0.1 to 5 μm, and which has a rough surface, said photosensitive layer consisting essentially of (a) an amount of diazonium salt polycondensation product sufficient to impart photosensitivity to said photosensitive layer and, evenly distributed in said photosensitive layer, (b) a colorless inorganic pigment which is insoluble in water and organic solvents and which has an average particle diameter from 1 to 20 μm, said inorganic pigment (i) being present in said photosensitive layer in a quantity ranging from about 0.01 to 2.0% by weight, relative to the weight of the non-volatile constituents of said photosensitive layer, and (ii) having an average diameter which exceeds the thickness of said photosensitive layer by about 1 to 15 μm, wherein said recording material, after exposing of said photosensitive layer through a halftone master image and developing, provides a copy image comprised of halftone dots that are closer in size to the master dots than those comprising a copy image provided by a recording material which comprises a negative-working photosensitive layer lacking said inorganic pigments.

4,687,727

LIGHT-SENSITIVE PLANOGRAPHIC PRINTING PLATE WITH LAYER OF DIAZO RESIN CONTAINING PHOTOPOLYMERIZABLE COMPOSITION

Tadao Toyama; Kesanao Kobayashi; Mitsuru Koike, all of Shizuoka, and Koji Tamoto, Kanagawa, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 534,517, Sep. 21, 1983, abandoned. This application Sep. 9, 1985, Ser. No. 774,165

Claims priority, application Japan, Sep. 21, 1982, 57-164435

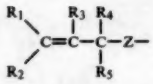
The portion of the term of this patent subsequent to Apr. 16, 2002, has been disclaimed.

Int. Cl.[4] G03C 1/60, 1/68

U.S. Cl. 430—175 7 Claims

1. A light-sensitive planographic printing plate comprising a layer of a photo-polymerizable composition provided on at least one side of a base, wherein said photo-polymerizable composition is soluble in an organic solvent and comprises in admixture:

(A) a polymer which is a copolymer of methacrylic acid and a monomer having an unsaturated group represented by the general formula (I)



(I)

wherein R_1 to R_5 each represent a member selected from the group consisting of a hydrogen atom, a halogen atom, a carboxyl group, a sulfo group, a nitro group, a cyano group, an amido group, an amino group and a substituted or unsubstituted alkyl group, aryl group, alkoxy group, aryloxy group, alkylamino group, arylamino group, alkylsulfonyl group and arylsulfonyl group and Z represents an oxygen atom, a sulfur atom, NH or NR, wherein R represents and alkyl group; wherein said monomer is selected from the group consisting of allyl methacrylate, cinnamoyl methacrylate, crotonyl methacrylate and methallyl methacrylate, and wherein the monomer content and the methacrylic acid content in said polymer are 10 to 90% by mol and 5 to 60% by mol, respectively;

(B) a monomer or oligomer having at least two polymerizable ethylenically unsaturated bonds;

(C) a photo-polymerization initiator; and

(D) a diazo resin soluble in organic solvents and which is the reaction product of a condensate product with an anion,

wherein said diazo resin (D) is homogenously blended with components (A)–(C) in an amount of from 1–30% by weight based on the total amount of the photo-polymerizable composition, wherein the weight ratio of component (B) to polymer (A) is in the range of from 1:9 to 7:3 and wherein the amount of component (C) employed is from about 0.5% by weight to about 15% by weight based on the total weight of the photo-polymerizable composition.

4,687,728

RADIATION SENSITIVE COMPOSITIONS

Christopher W. Folkard, and Christopher R. Millross, both of Leeds, England, assignors to Vickers PLC, London, England

Filed May 29, 1984, Ser. No. 614,993

Claims priority, application United Kingdom, May 31, 1983, 8314918

Int. Cl.[4] G03C 1/495

U.S. Cl. 430—270 7 Claims

1. A radiation sensitive composition comprising a radiation sensitive material which, upon exposure to radiation, exhibits image areas and non-image areas of differing solubility and a heat sensitive cationic, azo dye, having a chromophoric resonance conjugation system and a positive charge distributed over the system, the dye being such as to undergo a color change at a temperature of at least 180° C. and being present in

an amount effective to cause the composition to change color when it is heated to said temperature after exposure to radiation.

4,687,729

LITHOGRAPHIC PLATE

Donald E. Cadwell, St. Paul, and Larry A. Brey, Woodbury, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 25, 1985, Ser. No. 791,602
Int. Cl.[4] G03C *1/76*
U.S. Cl. 430—271 **25 Claims**

1. A photosensitive article comprising:

A. A tin-free steel or stainless steel substrate in the form of a film or sheet,

B. a hydrophilic ceramic layer and adhered to said substrate and comprising (1) non-metallic inorganic particles and (2) a water-resistant phase, or phases, of a dehydration product of at least one monobasic phosphate , said ceramic layer having a thickness between 0.2 and 15 micrometers, and

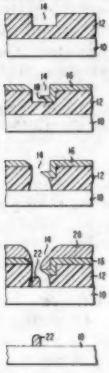
C. a photosensitive lithographic coating coated over said ceramic layer.

4,687,730

LIFT-OFF TECHNIQUE FOR PRODUCING METAL PATTERN USING SINGLE PHOTORESIST PROCESSING AND OBLIQUE ANGLE METAL DEPOSITION

Murat Eron, South Brunswick Township, Mercer County, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Oct. 30, 1985, Ser. No. 792,790
Int. Cl.[4] G03F *7/26*; H01L *21/44*; G03C *5/00*
U.S. Cl. 430—324 **10 Claims**



1. A process for forming on a substrate a patern of metallization significantly finer than the resolution capability of a photoresist material utilizing a single layer of photoresist comprising:

(a) forming a single layer of a positive photoresist on the substrate;

(b) pattern irradiating the photoresist layer with a dosage of actinic radiation such that, upon development, the irradiated pattern of the photoresist layer will be only partially removed;

(c) developing the irradiated photoresist layer, thus forming recesses which extend only partially through the thickness of the photoresist layer;

(d) depositing a first layer of metallization onto the irradiated and developed photoresist layer at an oblique angle such that it does not completely cover said recesses;

(e) flood irradiating the portion of the photoresist layer not covered by the first layer of metallization, said portion lying within the recesses with actinic radiation and developing by removing said portion of the photoresist layer whereby openings are formed in the recesses of the photoresist layer which extend to the substrate;

(f) depositing a second layer of metallization over the substrate and first layer of metallization, wherein the metallization deposited on the substrate through said openings separates from that deposited on the first layer of metallization;

(g) contacting the photoresist layer with an organic solvent capable of separating the irradiated, developed and metallized photoresist layer from the substrate; and

(h) removing the layer of photoresist and metallization deposited thereover from the substrate leaving the second layer of metallization deposited in the openings.

4,687,731

METHOD FOR PROCESSING LIGHT-SENSITIVE SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL WHICH CONTAINS A HIGH SPEED REACTIVE YELLOW COUPLER BY PROCESSING, AFTER FIXINGS, WITH A SULFITE-CONTAINING SOLUTION AND WITHOUT SUBSTANTIAL WASHING

Masao Ishikawa; Shigeharu Koboshi, and Satoru Kuse, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Nov. 4, 1985, Ser. No. 794,642
Claims priority, application Japan, Nov. 14, 1984, 59-241491
Int. Cl.[4] G03C *7/32, 3/00, 11/00, 1/46*
U.S. Cl. 430—372 **19 Claims**

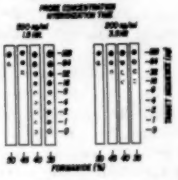
1. A method of processing a light-sensitive silver halide color photographic material comprising color developing an imagewise exposed light-sensitive silver halide color photographic material comprising a blue-sensitive silver halide emulsion layer, a green-sensitive silver halide emulsion layer and a red-sensitive silver halide emulsion layer on a base, said blue-sensitive silver halide emulsion layer containing a high speed reactive yellow coupler having a relative coupling reaction rate of not less than 0.3, followed by processing with a processing solution having a fixing ability and then processing with a stabilizing solution without a substantial washing step, said stabilizing solution containing a sulfite in an amount of at least 1×10^{-3} mole per 1 liter of said stabilizing solution.

4,687,732

VISUALIZATION POLYMERS AND THEIR APPLICATION TO DIAGNOSTIC MEDICINE

David C. Ward, Guilford; Jeffry J. Leary, East Haven, both of Conn., and David J. Brigati, Hershey, Pa., assignors to Yale University, New Haven, Conn.

Filed Jun. 10, 1983, Ser. No. 503,298
Int. Cl.[4] G01N *33/53, 33/533, 33/534, 33/535*
U.S. Cl. 435—6 **45 Claims**



23. A method for visualizing the presence of an inorganic or organic target molecule in a biological material, which comprises:

combining said target with a detecting agent with carries a visualization polymer comprising essentially identical multiple visualization units directly bonded together or linked by a coupling agent through chemical groups or backbone moieties of said visualization units;

said visualization unit having at least one visualization site and said visualization unit being an enzyme wherein the enzymatic site is the visualization site, a tagged natural or synthetic polypeptide, a tagged polyol, a tagged polyolefin or a tagged polycarbohydrate wherein the tag of the tagged polypeptide, the tagged polyol, the tagged polyolefin or the tagged polycarbohydrate is the visualization site thereof,

said chemical group being an amine group, an oxidized 1,2-diol group, a carboxy group, a mercaptan group, a hydroxy group or a carbon-hydrogen bond;

said chemical group or backbone moiety being located within said visualization unit at a position which is at least one atom away from the visualization site of said visualization unit;

said coupling agent being derived from a reactive bi- or multi- homo- or hetero-functional organic cross-linking reagent of the formula

wherein A, B and E are independently selected from the group consisting of hydrogen, a carboxylic acid group, an acid halide group, an activated ester, a mixed anhydride, an acyl imidazole, an N-(carbonyloxy)imide group, an iminoester, a primary amine, an aldehyde group, an alphahalomethylcarbonyl group, a hydrazine group, an acylhydrazide group, an azide group and an N-maleimide group; at least two of A, B and E are other than hydrogen; and R^1 is an aliphatic group of at least two carbons or an aromatic group of at least six carbons; and

the tag of the tagged polypeptide, tagged polyol, tagged polyolefin or tagged carbohydrate is a fluorescent chemical group, a dye, a radioactive group, a photon emitter or an electron dense moiety.

4,687,733

EARLY CANCER DETECTION METHOD

Ronald W. Trewyn, Upper Arlington, and Steven M. D'Ambrosio, Columbus, both of Ohio, assignors to Ohio State University, Columbus, Ohio

Filed Jan. 30, 1984, Ser. No. 575,262
Int. Cl.[4] G01N *33/53*
U.S. Cl. 435—7 **19 Claims**

1. A method for the early detection of or relapse of leukemia in a human by determining the presence of elevated levels of the 1-methylinosine modified nucleoside using antibodies specific to the modified nucleoside comprising the following steps:

producing a polyclonal or monoclonal antibody specific to said modified 1-methylinosine nucleoside component, said modified 1-methylinosine nucleoside component being present in elevated levels in said human having cancer;

admixing said antibody with a body fluid drawn from said human, said body fluid having a quantity of said modified 1-methylinosine nucleoside component therein, said antibody reacting with said modified 1-methylinosine nucleoside component present in said body fluid to form a modified 1-methylinosine nucleoside antibody complex;

thereafter determining the presence of elevated levels of said modified 1-methylinosine nucleoside component in said admixture by observing the presence of said modified 1-methylinosine nucleoside-antibody complex present in said body fluid.

4,687,734

IMMUNOASSAY FOR THE DETECTION OF HUMAN COLON CANCER USING A POLYCLONAL ANTIBODY DERIVED FROM A CAPILLARY CULTURE OF TUMOR CELLS

Samuel J. Chester, 56 Dellwood Rd., Cranston, R.I. 02920

Filed Jun. 7, 1984, Ser. No. 618,085
Int. Cl.[4] G01N *33/53*
U.S. Cl. 435—7 **3 Claims**

1. An immunoassay method for the early detection of human colon cancer using a labeled antibody anti-human colon carcinoma which method includes the steps of,

withdrawing blood from a patient to provide a blood sample,

separating said blood sample into serum and packed red blood cells,

removing immune complexes from said serum with protein A covalently bound to agarose gels,

disassociating the removed immune complexes into antigen and antibody components with an aqueous solution of 2M glycine-Hcl pH 3.0,

adding said labeled antibody to said antigen and antibody components to form a mixed solution containing said antigen and labeled and unlabeled antibody components,

adding an aqueous solution of 1N NaOH pH 11.0 to said mixed solution to neutralize the mixed solution to pH 7.0 and re-form immune complexes in the neutralized mixed solution,

precipitating said re-formed immune complexes with a solution of polyethylene glycol 6000 molecular weight,

and detecting the precipitated re-formed immune complexes.

4,687,735

ENZYMATIC POLY-REACTANT CHANNELING BINDING ASSAY

Robert K. DiNello, Cupertino; Ian Gibbons, Palo Alto, and Edwin F. Ullman, Atherton, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Mar. 14, 1983, Ser. No. 474,906
Int. Cl.[4] G01N *33/535*
U.S. Cl. 435—7 **17 Claims**

1. A method for detecting the presence of an analyte in a sample suspected of containing said analyte, when said analyte is a member of a specific binding pair consisting of first and second binding members ("FBM" and "SBM", respectively),

said method employing a channeling signal producing system comprising an enzyme, designated as enzyme$^+$, conjugated to an SBM to provide enzyme$^+$-SBM conjugate, an enzyme substrate and a Final Reactant, wherein said Final Reactant is (1) another enzyme, designated as enzyme*, where the two enzymes are related by the substrate of one enzyme being the product of the other enzyme, or (2) a compound which reacts with the product of enzyme$^+$, wherein the reactions of said enzyme$^+$ in conjunction with enzyme* or said compound results in a change in an observable signal in relation to the amount of analyte in said sample; and

linking system providing for the polymerization of said Final Reactant and the incorporation of enzyme$^+$ within the polymer as a function of the binding of enzyme$^+$-SBM conjugate to FBM so as to form a polymeric channeling aggregate;

said method comprising:

combining in an aqueous assay medium;

(a) said sample;

(b) said enzyme$^+$-SBM conjugate, and FBM when said analyte is a SBM, so as to form a complex between said FBM and said enzyme$^+$-SBM conjugate in relation to the amount of analyte present;

(c) any members of said linking system, whereby there is formed a polymeric channeling aggregate of said Final

Reactant and a complex of enzyme$^+$-SBM conjugate with FBM; and

(d) remaining members of a signal producing system, whereby a Final Product is produced as a result of channeling of said members of said signal producing system in said polymeric channeling aggregate, which results in a change in a detectable signal; and

comparing said detectable signal to the detectable signal observed in an assay medium having a known amount of analyte.

4,687,736

DETECTION OF BIOLOGICAL SUBSTANCES BY SPECIFIC LABELLING TECHNIQUES

Goeffrey R. Newman, Rhoose; Bharat Jasani, Penarth, and Edward D. Williams, Boverton, all of United Kingdom, assignors to The University of Wales College of Medicine, Cardiff, United Kingdom

Filed Oct. 31, 1984, Ser. No. 666,679

Int. Cl.^{4} C12Q *1/68, 1/28;* **G01N** *33/53, 33/566*

U.S. Cl. 435—7 **18 Claims**

1. A method of detecting or quantifying a substance of biological interest in which a peroxidase enzyme marker substance is specifically linked with said substance of interest, the peroxidase is reacted with a visualizing agent selected from the group consisting of (a) diaminobenzidine, (b) 4-chloro-1-naphthol, and (c) amino-9-ethyl-carbazole, the product of the visualizing agent/peroxidase reaction is reacted with a gold salt and with a sulphide salt, and the gold sulphide reaction product is then included as a catalyst in a further reaction with a silver developing solution to precipitate reduced silver.

4,687,737

MAMMALIAN SUPPRESSOR GENES

Phillip A. Sharp, Newton, Mass.; Mario R. Capecchi, Salt Lake City, Utah; Uttam L. RajBhandary, Lexington, Mass., and Frank A. Laski, Southfield, Mich., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation of Ser. No. 441,200, Nov. 12, 1982, abandoned. This application Jul. 2, 1985, Ser. No. 751,461

Int. Cl.^{4} C12N *15/00, 5/00, 5/02, 7/00*

U.S. Cl. 435—68 **21 Claims**

1. A method of suppressing a nonsense codon in a gene for production of a protein of interest in mammalian cells, the method comprising:

(a) preparing an oligonucleotide primer comprising a region complementary to the nonsense codon;

(b) preparing a DNA template for production of a tRNA molecule;

(c) forming a suppressor gene from said template and primer by site specific mutagenesis; and

(d) transforming the suppressor gene into a mammalian cell, whereby the nonsense codon will be suppressed.

4,687,738

METHOD FOR THE PRODUCTION OF HA FRACTION CONTAINING PROTECTIVE ANTIGENS OF *BORDETELLA PERTUSSIS* AND *PERTUSSIS* VACCINE

Akihiro Ginnaga; Hiroshi Koba; Shin Sakuma; Hisashi Kitagawa; Akira Yamada, all of Kumamoto, and Yoji Suzuki, Hino, all of Japan, assignors to The Chemo-Sero-Therapeutic Res. Inst., Kumamoto and Teijin Limited, Osaka, both of, Japan

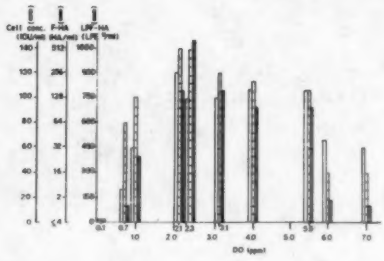
Continuation of Ser. No. 591,169, Mar. 19, 1984, abandoned. This application Jun. 16, 1986, Ser. No. 874,670

Claims priority, application Japan, Mar. 30, 1983, 58-54680; Apr. 2, 1983, 58-58548

Int. Cl.^{4} C12P *21/00*

U.S. Cl. 435—68 **7 Claims**

1. A method for the large scale production of HA fraction containing protective antigens of *Bordetella pertussis,* which comprises inoculating a strain of *B. pertussis* in a liquid medium containing a compound selected from the group consisting of methylated α-cyclodextrin, methylated β-cyclodextrin, methylated γ-cyclodextrin, α-cyclodextrin, β-cyclodextrin, and γ-cyclodextrin, and a combination of two or more thereof,



culturing it in a spinner culture at a culture temperature of 20° to 37° C., at an amount of dissolved oxygen of 1.0 to 5.5 ppm under defoaming conditions, separating the culture broth at the stage of from logarithmic growth phase to static growth phase.

4,687,739

METHOD FOR TREATING AQUEOUS SOLUTION OF SOYBEAN PROTEIN WITH ENZYMES

Ko Sugisawa; Masanori Yamamoto; Atsushi Yasuda; Yukihiro Nomura, and Toshio Amano, all of Osaka, Japan, assignors to House Food Industries Co., Ltd., Osaka, Japan

Filed May 30, 1985, Ser. No. 739,337

Claims priority, application Japan, Jun. 8, 1984, 59-116711

Int. Cl.^{4} A23J *1/14*

U.S. Cl. 435—69 **7 Claims**

1. A method for treating an aqueous solution of denatured soybean protein comprising the steps of:

(a) adding endpeptidase to an aqueous solution of denatured soybean protein having a soybean protein concentration in the range of 1–4% by weight and and adjusted pH in the range of 6–8 to provide a mixture,

(b) causing the components of said mixture to react with each other at a temperature in the range of 25°–95° for a time period in the range of 120 minutes–1 minute,, and

(c) adding calcium salt to the reaction product in such an amount that the resulting mixture has a calcium concentration in the range of 10–50 mM.

4,687,740

DECAPEPTIDES PRODUCED FROM BIOADHESIVE POLYPHENOLIC PROTEINS

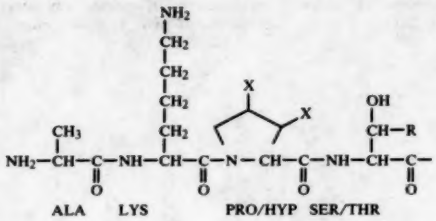
J. Herbert Waite, Collinsville, Conn., assignor to University of Connecticut Research & Development Corp., Farmington, Conn.

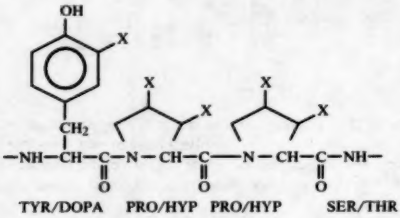
Division of Ser. No. 587,132, Mar. 7, 1984, Pat. No. 4,585,585. This application Jan. 21, 1986, Ser. No. 820,143

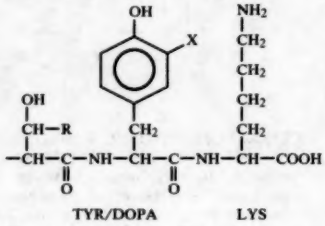
Int. Cl.^{4} C12P *21/06*

U.S. Cl. 435—69 **6 Claims**

1. A method for the preparation of decapeptides of the formula:







wherein each X is independently selected from the group consisting of hydroxyl and hydrogen, wherein each R is independently selected from the group consisting of hydrogen and methyl which comprises the steps of:

(a) isolating bioadhesive proteins from mussel phenol glands;

(b) enzymatically digesting said bioadhesive protein; and

(c) recovering said decapeptides.

4,687,741

NOVEL ENZYMES WHICH CATALYZE THE DEGRADATION AND MODIFICATION OF LIGNIN

Roberta L. Farrell, Danvers, Mass.; Thomas K. Kirk, Verona, Wis., and Ming Tien, State College, Pa., assignors to Repligen Corporation, Cambridge, Mass. and The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Continuation-in-part of Ser. No. 755,242, Jul. 15, 1985, abandoned. This application Mar. 28, 1986, Ser. No. 845,655

Int. Cl.[4] C12N *9/02, 15/00, 1/14, 9/14;* **D21C** *3/00;* **C12R** *1/645*

U.S. Cl. 435—189 **8 Claims**

1. rLDM TM 1, substantially free of other rLDM TM and deleterious native proteins, having the following characteristics:

(a) catalyzes the oxidation of veratryl alcohol to veratrylaldehyde at about 2.6 units/mg.min.;

(b) has a molecular weight of about 38 kilodaltons;

(c) contains a single protoheme IX moiety;

(d) is glycosylated;

(e) contains the following amino acid ratio:

Amino Acid	rLDM TM 1 Ratio
asp/asn	1.4
glu/gln	6.0
ser	4.3
his	4.4
gly	6.5
thr	2.2
arg	1.1
ala	7.3
tyr	0.2
met	—
val	1.6
phe	1.1
ile	1.0
leu	1.5
lys	0.5;

(f) reacts to polyclonal antibodies made to rLDM TM 2 and 6 in an immunoblot procedure;

(g) elutes from an FPLC column at a sodium acetate molarity of about 0.16; and

(h) has the following activities on lignin model substrates:

(1) oxidative cleavage of C_α–C_β;

(2) hydroxylation of benzylic methylene groups;

(3) oxidation of benzyl alcohols to aldehydes;

(4) phenol oxidation; and

(5) oxidative cleavage of methoxyl groups.

8. A biologically pure mutuant culture of *Phanerochaete chrysosporium,* designated mutant SC26, and having the culture deposit number NRRL 15978, which mutuant, upon being grown in a suitable medium, elaborates rLDM TM 1, rLDM TM 2, rLDM TM 3, rLDM TM 4, rLDM TM 5, and rLDM TM 6 into the medium.

4,687,742

XYLOSE ISOMERASE (GLUCOSE ISOMERASE) FROM *STREPTOMYCES MURINUS* CLUSTER

Georg Skoet, Virum, and Hanne Guertler, Lyngby, both of Denmark, assignors to Novo Industri A/S, Bagsvaerd, Denmark

Filed Mar. 25, 1985, Ser. No. 715,936

Claims priority, application Denmark, Mar. 12, 1985, 1111/85

Int. Cl.[4] C12N *9/92;* **C12R** *1/465;* **C12P** *19/24*

U.S. Cl. 435—234 **4 Claims**

4. An enzyme product comprising the xylose isomerase of the *Streptomyces murinus* cluster strain DSM 3252 in cell mass immobilized enzyme granulate form with a unit activity exceeding about 75 glucose isomerase per gram.

4,687,743

SUNFLOWER REGENERATION MEDIA, METHOD OF USE AND PLANTS REGENERATED THEREON

Karol E. Paterson, Oakland, and Nicholas P. Everett, El Sobrante, both of Calif., assignors to Stauffer Chemical Company, Richmond, Calif.

Filed Feb. 27, 1984, Ser. No. 584,079

Int. Cl.[4] C12N *5/00, 5/02*

U.S. Cl. 435—240.49 **21 Claims**

1. An inbred sunflower shoot or plant embryo regeneration-effective medium comprising minimal salts, Casamino acids, a carbohydrate source, an inbred sunflower shoot or plant embryo regeneration effective mixture of vitamins comprising 0.1 to less than 10 mg/l thiamine; about 0.5 mg/l nicotinic acid; 0.1 to 0.5 mg/l pyridoxine.HCl, 2 to 3 mg/l glycine, about 40 mg/l adenine sulfate and from greater than 1 mg/l to less than 1000 mg/l inositol and an inbred sunflower shoot or plant embryo regeneration effective mixture of plant hormones comprising greater than 0.5 mg/l to less than 10 mg/l benzyladenine, greater than 0.5 mg/l to less than 10 mg/l naphthalene acetic acid and greater than 0.05 mg/l to less than 1.0 mg/l gibberellic acid.

4,687,744

ARTIFICIAL CULTURE OF THE SEXUAL STAGE OF LAGENIDIUM GIGANTEUM

James L. Kerwin, Woodland, and Robert K. Washino, Davis, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Continuation-in-part of Ser. No. 431,176, Sep. 30, 1982, abandoned. This application Jun. 19, 1984, Ser. No. 622,094
Int. Cl.[4] C12N *3/00, 1/38, 1/14;* C12R *1/645*
U.S. Cl. 435—242 4 Claims

1. A method for in vitro induction of oospores comprising the step of: incubating zoospores or hyphal segments of Lagenidium giganteum in a culture medium under effective, oospore-inducing, incubation conditions comprising an assimilable source of carbon and an assimilable source of nitrogen; an oospore-inducing, effective amount of a sterol selected from a group consisting of cholesterol, 7-dehydrocholesterol, sitosterol, desmosterol, fucosterol, stigmasterol, cholesteryl acetate and cholesteryl palmitate; an oospore-inducing, effective amount of a non-toxic salt selected from the group consisting of calcium salts, magnesium salts, and mixtures thereof; and an oospore-inducing, effective amount of a compound selected from the group group consisting of oleic acid, palmitoleic acid, oleic acid esters, palmitoleic acid esters, linoleic acid esters, diolein, triolein, trilinolein and mixtures thereof.

4,687,745

USE OF RLDM TM 1-6 AND OTHER LIGNINOLYTIC ENZYMES IN THE TREATMENT OF MECHANICAL PULPS

Roberta L. Farrell, Danvers, Mass., assignor to Repligen Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 755,244, Jul. 15, 1985, abandoned. This application Mar. 28, 1986, Ser. No. 845,656
Int. Cl.[4] D21C *3/00, 3/20;* C12R *1/645*
U.S. Cl. 435—278 23 Claims

1. A process for enhancing the strength properties and brightness stability of mechanical pulp which comprises treating said pulp with the Ligninolytic Mixture TM from a *Phanerochaete chrysosporium* fermentation consisting essentially of rLDM TM 1 through 6, and other ligninolytic enzymes.

4,687,746

MICROORGANISM CULTURE-TRANSFER DEVICE

Melvyn Rosenberg, Ramat-Gan, and Ervin Weiss, Tel-Aviv, both of Israel, assignors to Ramot University Authority for Applied Research and Industrial Development Ltd., Tel Aviv, Israel

Filed Jan. 14, 1985, Ser. No. 690,999
Claims priority, application Israel, Jan. 20, 1984, 70737
Int. Cl.[4] C12M *1/26*
U.S. Cl. 435—292 9 Claims

1. A microorganism culture transfer device comprising a manually-grippable handle having a culture contacting tip at its two opposite ends for contacting a culture and streaking same a plurality of times over a culture plate in order to dilute the culture for purposes of isolating individual colonies, characterized in that said handle is of a configuration non-circular in cross-section having a plurality of at least three longitudinally-extending ribs constituting linear surfaces projecting from the outer face of the handle defining at least three discrete rotational positions when held between two of the use's fingers and rotated about the lingitudinal axis of the handle by moving one of said fingers relative to the other; and in that at least one of said culture-contacting tips is of a configuration such as to present a surface for contact with the culture when the handle is initially grasped by the user in any rotational position of the handle, and to provide a different and distinct but like surface around its circumference for contact with the culture in each of said discrete rotational positions of the handle.

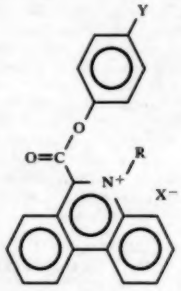
4,687,747

PHENANTHRIDINIUM ESTER AS A LABELLING COMPOUND IN LUMINOMETRIC IMMUNOASSAY

Wayne H. T. Lin, Chesterfield, Mo., assignor to Mallinckrodt, Inc., St. Louis, Mo.

Filed Jul. 2, 1984, Ser. No. 626,781
Int. Cl.[4] G01N *33/543;* C07D *221/12*
U.S. Cl. 436—518 15 Claims

1. A chemiluminescent compound of the formula:

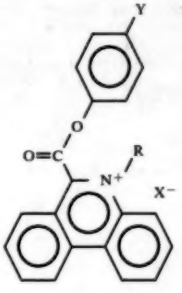


where R is an alkyl group having from 1 to 5 carbon atoms, X is an anion selected from the group consisting of sulfates, alkylsulfates, halosulfonates and halides, and Y is a chemical moiety which may bind to groups commonly found in analytes.

7. A luminometric immunoassay for detection of an antigen in a sample, comprising:

incubating an immobilized antibody specific to the antigen with a sample solution and a solution of labeled antibody; and

forming thereby an immobilized sandwich, said labeled antibody comprising a conjugate of an antibody and a chemiluminescent compound of the formula:



where R is an alkyl group having from 1 to 5 carbon atoms, X is an anion selected from the group consisting of sulfates, alkylsulfates, halosulfonates and halides, and Y is

a chemical moiety which may bind to groups commonly found in analytes;

separating the solution of labeled antibody from the immobilized sandwich;

reacting the labeled antibody in the immobilized sandwich with an oxidizing agent to cause light emission; and

measuring the amount of light emitted to determine the presence of antigen.

4,687,748

MAGNETIC CARBOHYDRATE PARTICLES AS CARRIERS FOR AFFINITY SEPARATION PURPOSES

Ulf Schröder, Lund, Sweden, assignor to Gambro Lundia AB, Sweden

PCT No. PCT/SE83/00106, § 371 Date Nov. 7, 1983, § 102(e) Date Nov. 7, 1983, PCT Pub. No. WO83/03426, PCT Pub. Date Oct. 13, 1983

PCT Filed Mar. 23, 1983, Ser. No. 552,144

Claims priority, application Sweden, Mar. 29, 1982, 8201972

Int. Cl.[4] G01N *33/553, 33/53, 33/545*

U.S. Cl. 436—526 **10 Claims**

1. A method for preparing magnetically responsive spheres comprising the steps of dissolving a carbohydrate polymer in a polar solvent therefor so as to obtain a dissolved carbohydrate; suspending magnetic material in said dissolved carbohydrate so as to obtain a suspension of magnetic material in said dissolved carbohydrate; emulsifying said suspension with an emulsion liquid which is immiscible with said suspension so as to form an emulsion containing droplets of said suspension in said emulsion liquid; stabilizing said emulsion by contacting said emulsion with a crystallizing liquid different than said polar solvent to thereby crystallize said carbohydrate polymer so as to enclose said magnetic material in spheres of said carbohydrate polymer having an average diameter of less than 1,000 nm; and separating said spheres therefrom.

4,687,749

REFRACTORY GLASS-CERAMICS CONTAINING ENSTATITE

George H. Beall, Big Flats, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Oct. 24, 1986, Ser. No. 922,948

Int. Cl.[4] C03C *10/04, 10/14, 10/06*

U.S. Cl. 501—5 **5 Claims**

1. A glass-ceramic article exhibiting a high modulus of rupture, a use temperature of at least 1200° C., a high fracture toughness, and a crystal content of at least 90% by volume, said article containing enstatite as the predominant crystal phase, at least one secondary crystal phase selected from the group consisting of β-spodumene solid solution, Ba-osumilite, celsian, anorthite, cristobalite, and strontium feldspar, and having a composition consisting essentially, expressed in terms of weight percent on the oxide basis, of about 20–35% MgO, 2–12% Al_2O_3, 40–70% SiO_2, and at least one metal oxide in the indicated proportion selected from the group consisting of 0–2% Li_2O, 0–4% CaO, 0–12% SrO, and 0–17% BaO, at least 0.5% Li_2O being required when present alone and at least 1% CaO and/or SrO and/or BaO being required in the absence of Li_2O, said composition being essentially free from Na_2O, K_2O, and fluoride.

4,687,750

TRANSPARENT GLASS-CERAMICS CONTAINING GAHNITE

Linda R. Pinckney, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Sep. 8, 1986, Ser. No. 904,286

Int. Cl.[4] C03C *10/02, 3/085*

U.S. Cl. 501—10 **2 Claims**

1. A highly transparent glass-ceramic article essentially free of Li_2O, Na_2O, CaO, SrO, and BaO, wherein gahnite having dimensions finer than about 300Åconstitutes essentially the sole crystal phase, the composition of said article consisting essentially, expressed in terms of weight percent on the oxide basis, of about 1.5–5% R_2O, consisting of 0–3% K_2O and/or 0–3% Rb_2O and/or 0–3% Cs_2O, 13–22% ZnO, 16–28% Al_2O_3, 45–65% SiO_2, and 1.5–8% TiO_2.

4,687,751

OPAL GLASS EXHIBITING A CREAMY-WHITE TINT

Pernette R. M. Barlier, Vulaines sur Seine, and Jean-Pierre Mazeau, Samoreau, both of France, assignors to Corning Glass Works, Corning, N.Y.

Filed Mar. 6, 1986, Ser. No. 836,767

Claims priority, application France, Aug. 30, 1985, 85 12923

Int. Cl.[4] C03C *14/00, 3/112, 3/118*

U.S. Cl. 501—32 **7 Claims**

1. A sodium fluoride opal glass composition exhibiting a creamy-white tint consisting essentially, in weight percent on the oxide basis, of

SiO_2	70–73	BaO	1–3
Na_2O	10.5–13	Fe_2O_3	0.05–0.30
F	4–5.5	TiO_2	0.1–1
CaO	0.2–1.7	As_2O_3	0–0.5
Al_2O_3	6–9	CeO_2	0–0.5.

4,687,752

MEDIUM WEIGHT ABRASION-RESISTANT CASTABLE

Dennis D. Peters, King of Prussia, Pa., assignor to Resco Products, Inc., Norristown, Pa.

Filed Jun. 21, 1984, Ser. No. 622,922

Int. Cl.[4] C04B *35/44, 35/02*

U.S. Cl. 501—121 **21 Claims**

1. A medium weight castable for use as a refractory lining characterized by a synthetic cordierite containing material having a grain size of 6×20 Tyler mesh an amount from about 30% to about 50% by weight; calcined kaolin, calcined flint or fused silica having a grain size of less than Tyler 20 in an amount from about 14% to about 34% by weight; fly ash cenospheres in an amount up to about 6% by weight; air floated clay in an amount up to about 5% by weight; fume silica ultrafine in an amount up to about 5% by weight; and a binder in an amount from about 20% to about 35% by weight.

4,687,753

LASER PRODUCED IRON CARBIDE-BASED CATALYSTS

Rocco A. Fiato, Scotch Plains; Gary W. Rice, Whitehouse Station; Sabato Miseo, and Stuart L. Soled, both of Pittstown, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Oct. 25, 1985, Ser. No. 791,509

Int. Cl.[4] B01J *37/34, 27/22, 19/12;* **C07C** *1/04*

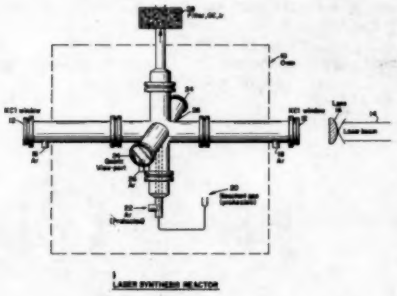
U.S. Cl. 502—5 **32 Claims**

1. A composition of matter comprising finely divided catalytic particles each particle containing iron, a transition metal, selected from the group consisting of Sc, Ti, V, Cr, Mn, Ni, Cu, and Zn, and carbon, in the substantial absence of silicon, at least a substantial portion of which particle is cementite, at least a substantial portion of said transition metal is in the cementite lattice, which particles are produced in a reaction zone in the presence of laser radiation under such conditions of laser flux density, power absorption, iron carbonyl reactant and transition metal compound reactant concentration and pressure to produce said particles having an average diameter of between 1 to 100 nm.

7. The composition of claim 1 additionally containing at least one promoter selected from alkali and alkaline earth metals which are added by impregnation from an aqueous salt solution.

20. A method for producing finely divided catalytic particles comprising the steps of:

introducing an iron carbonyl reactant and an organic first row transition metal compound selected from the group consisting of Sc, Ti, U, Cr, Mn, Ni, Cu and Zn into a reaction chamber into which a laser is focused at such



conditions of total pressure, iron carbonyl and organic first row transition metal compound partial pressure, laser energy flux density and power absorption that finely divided particles at least a portion having a cementite structure comprising iron, a first row transition metal and carbon and having average diameters between 1 and 100 nm are produced.

4,687,754

CATALYTIC CRACKING CATALYSTS AND PROCESS

Regis J. Pellet, Croton-On-Hudson; Donald F. Best, Mahopac; Gary N. Long, Putnam Valley; Jule A. Rabo, Armonk, and Edward T. Wolynic, Scarsdale, all of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.

Continuation-in-part of Ser. No. 490,965, May 2, 1983, abandoned. This application Oct. 3, 1984, Ser. No. 657,417

Int. Cl.[4] B01J *29/06*

U.S. Cl. 502—65 **21 Claims**

1. The process for the preparation of a cracking catalyst comprising the treatment of a zeolitic aluminosilicate which has a mole ratio of oxides in the dehydrated state of

(0.85–1.1) $M_{2/n}O:Al_2O_3$; $xSiO_2$

wherein M is a cation having a valence of "n" and "x" has a value greater than 6.0; has an x-ray powder diffraction pattern having at least the d-spacings of Table A and having extraneous silicon atoms in the crystal lattice in the form of framework SiO_4 tetrahedra by employing at least one of the following steps of:

(i) treating the aluminosilicate at an effective temperature for an effective time;

(ii) providing an effective amount of at least one multivalent cation selected from the class consisting of cerium, lanthanum, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium and mixtures thereof; with the proviso that steps (i) and (ii) can be carried out for one or more times in any order.

4,687,755

METAL PERFLUOROSULPHONIC ACID POLYMER CATALYST

Michael J. Green, Yateley, Nr. Camberley, England, assignor to BP Chemicals Limited, London, England

Filed Jun. 26, 1986, Ser. No. 879,141

Claims priority, application United Kingdom, Jul. 6, 1985, 8517188

Int. Cl.[4] B01J *31/06*

U.S. Cl. 502—159 **10 Claims**

1. A perfluorosulphonic acid polymer suitable for use as a catalyst containing units of the formula:

$$-(SO_3)_wM(SO_3R)_{z-w}- \quad (I)$$

wherein

M is a multivalent metal cation,

R is a C_1 to C_8 fluorinated alkyl group,

z is the valency of M, and

w is an integer having a value between 1 and z−1.

4,687,756

VULCANIZATION ACCELERATOR, A MEANS FOR ACCELERATING VULCANIZATION AND AN IMPROVED RUBBER PRODUCT CONTAINING SAID ACCELERATOR THEREIN

Akinori Okamoto, Toyonaka; Tetsuo Yamaguchi, Hirakata; Haruki Okamura, Osaka, and Eizo Okino, Kurashiki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Nov. 22, 1985, Ser. No. 800,703

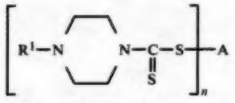
Claims priority, application Japan, Dec. 3, 1984, 59-255955

Int. Cl.[4] B01J *31/02*

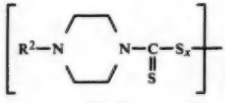
U.S. Cl. 502—165 **4 Claims**

1. A vulcanization accelerator containing as an active ingredient a compound having at least one dithiocarbamoyl group, which is shown by the general formula [I]:

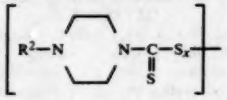
[I]



wherein R^1 stands for an alkyl group having one to 12 carbon atoms, a cycloalkyl group having 3 to 8 carbon atoms, an aryl group having 6 to 12 carbon atoms or an aralkyl group having 7 to 13 carbon atoms, A stands for a group shown by the formula



or metallic atom selected from the group consisting of zinc, copper, iron, cobalt, nickel, cadmium, and mercury; in which x represents zero or an integer of 1 to 5, R^2 is an alkyl group having one to 12 carbon atoms, a cycloalkyl group having 3 to 8 carbon atoms, an aryl group having 6 to 12 carbon atoms or an aralkyl group having 7 to 13 carbon atoms; and n is one when A stands for a group shown by the formula



and is an integer of 1 to 4 corresponding to the valency when A stands for a metallic atom selected from the group consisting of zinc, copper, iron, cobalt, nickel, cadmium, and mercury.

4,687,757

HYDROFINING CATALYST COMPOSITION AND PROCESS FOR ITS PREPARATION

Stephen L. Parrott; Simon G. Kukes, and Karlheinz K. Brandes, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 24, 1986, Ser. No. 843,489
Int. Cl.[4] B01J *21/04, 21/06, 23/28, 27/051*
U.S. Cl. 502—220 **50 Claims**

1. A process for preparing a composition of matter comprising alumina as support material, at least one compound of titanium , at least one compound of molybdenum and at least one compound of aluminum, said process comprising the steps of:

(A) impregnating a support material consisting essentially of alumina with a solution comprising water, at least one compound of titanium and at least one compound of aluminum;

(B) heating the material obtained in step (A) under such conditions as to at least partially dry said material obtained in step (A);

(C) impregnating the at least partially dried material obtained in step (B) with a solution comprising water and at least one compound of molybdenum;

(D) heating the material obtained in step (C) at a first temperature so as to at least partially dry said material obtained in step (C);

(E) heating the at least partially dried material obtained in step (D) at a second temperature, which is higher than said first temperature, so as to activate said at least partially dried material obtained in step (D).

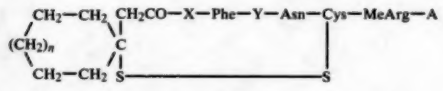
4,687,758

DES-PROLINE-N-METHYLARGININE VASOPRESSINS

Fadia E. Ali, Cherry Hill, N.J.; William F. Huffman, Malvern, Pa.; Garland R. Marshall, Clayton, Mo., and Michael L. Moore, Media, Pa., assignors to SmithKline Beckman Corporation, Philadelphia, Pa.

Filed Nov. 19, 1985, Ser. No. 799,718
Int. Cl.[4] A61K *37/34;* **C07K** *7/16*
U.S. Cl. 514—11 **8 Claims**

1. A polypeptide compound having the formula:



in which:

X is a D or L isomer of Tyr, Tyr(Alk), Ile, Phe or Phe(Alk);

n is 0 or 1;

Y is Val or Abu; and,

A is NH_2, OH, Gly(OH) or Gly(NH_2), or a pharmaceutically acceptable salt, ester prodrug or complex thereof.

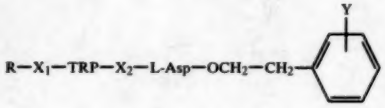
4,687,759

TRIPEPTIDE AND TETRAPEPTIDE ESTERS WHICH INHIBIT GASTRIC SECRETION, PROCESS FOR THEIR PREPARATION AND PHARMACEUTICAL COMPOSITIONS IN WHICH THEY ARE PRESENT

Jean Martinez, Caux; Jean-Pierre Bali, Saint-Gely-du-Fesc; Richard Magous, Lunel; Bertrand Castro, Saint-Aunes, and Henri Demarne, Montpellier, all of France, assignors to Sanofi and Centre National de la Recherche Scientifique (CNRS), both of Paris, France

Filed Dec. 16, 1985, Ser. No. 808,959
Claims priority, application France, Dec. 20, 1984, 84 19545
Int. Cl.[4] A61K *37/43;* **C07K** *5/08*
U.S. Cl. 514—18 **6 Claims**

1. A peptide of the formula:



(I)

in which:

R represents hydrogen or a protecting group for the terminal amine group;

X_1 represents either beta-Ala or a direct bond between R and the terminal amine group of the amino acid TRP;

TRP denotes either the L isomer or the D isomer of tryptophan;

X_2 represents L-leucine, L-methionine or L-norleucine; and

Y denotes hydrogen, a halogen atom, a trifluoromethyl group, a cyano group or a nitro group.

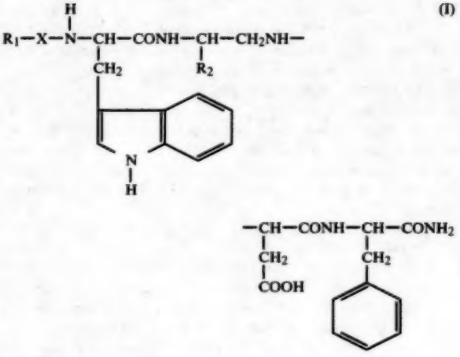
4,687,760

REDUCED PEPTIDES WHICH INHIBIT GASTRIC SECRETION, PROCESS FOR THEIR PREPARATION AND PHARMACEUTICAL COMPOSITIONS IN WHICH THEY ARE PRESENT

Jean Martinez, Caux; Jean-Pierre Bali, Saint-Gely Du Fesc; Richard Magous, Lunel; Bertrand Castro, Saint-Aunes, and Henri Demarne, Montpellier, all of France, assignors to Sanofi and Centre National de la Recherche Scientifque (CNRS)

Filed Dec. 16, 1985, Ser. No. 809,131
Claims priority, application France, Dec. 20, 1984, 84 19544
Int. Cl.[4] A61K *37/43;* **C07K** *5/02, 5/08, 5/10*
U.S. Cl. 514—18 **11 Claims**

1. A peptide corresponding to the general formula:



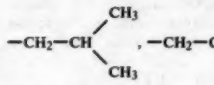
(I)

in which:

R_1 represents hydrogen or a protecting group for the amine group; benzyloxycarbonyl

X represents beta-alanine, glycine or a direct bond between R_1 and the amine group; and

R_2 represents a group chosen from:



corresponding to the side chains of the natural amino acids leucine, methionine and norleucine, and also its salts with inorganic or organic bases.

4,687,761

PHARMACEUTICAL COMPOSITION FOR INCREASING IMMUNITY AND DECREASING SIDE EFFECTS OF ANTICANCER CHEMOTHERAPY

Yaguang Liu, 30 Seaman Ave., New York, N.Y. 10034

Filed May 9, 1985, Ser. No. 732,146
Int. Cl.[4] A61K *31/705*
U.S. Cl. 514—26 10 Claims

1. A pharmaceutical composition for treatment of side effects of anticancer chemotherapy using a drug selected from a group consisting of adriamycin and cyclophosphamide comprising, in weight percent,: ferulic acid 15–60%; ginsenoside b, 5–50%; anethole 20–65% and sodium cinnamate 15–60%.

9. A method for treatment of humans suffering from side effects of anticancer chemotherapy using a drug selected from a group consisting of adriamycin and cyclophosphamide, comprising administering to said humans effective doses of the composition of claim 1.

4,687,762

WATER SOLUBLE DRUG COMPLEX AND METHOD FOR PRODUCTION OF SAME

Tsunekazu Fukushima, Hyogo; Hiroshi Emoto, Osaka; Yoshio Kagitani, Nara; Kazumasa Yokoyama; Masayuki Nishida, both of Osaka, and Tadakazu Suyama, Kyoto, all of Japan, assignors to Green Cross Corporation, Osaka, Japan

Filed Mar. 27, 1985, Ser. No. 716,436
Claims priority, application Japan, Mar. 31, 1984, 59-63994
Int. Cl.[4] A61K *31/70, 31/685, 31/545*
U.S. Cl. 514—34 29 Claims

1. A method of producing a water-soluble complex comprising a water-insoluble drug which is a pharmacologically active compound having a molecular weight not over 1,000 and a phospholipid, comprising the steps of (1) dissolving a water-insoluble drug and a phospholipid in an organic solvent in a ratio of 0.01 to 10 parts by weight of said drug per part by weight of said phospholipid, (2) removing the solvent by evaporation to leave behind a drug-containing phospholipid film, (3) suspending the resulting film in physiologically acceptable aqueous solution, (4) ultrasonicating the film, whereby particle diameter is adjusted to 0.2 to 2 μm, (5) centrifuging the resulting suspension at 10,000× g or more for a period of 30 minutes to 2 hours to divide it into three layers comprising an upper layer, an intermediate layer and a lower most layer, and (6) recovering the lowermost layer of the resulting sediment to yield the water-soluble complex.

4,687,763

COMPOSITION AND METHOD FOR INCREASING LEVELS OR RELEASE OF BRAIN SEROTONIN

Richard J. Wurtman, Boston, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Feb. 25, 1985, Ser. No. 705,174
Int. Cl.[4] A61K *31/70*
U.S. Cl. 514—53 6 Claims

1. A composition which, when administered to an animal, increases the release or levels of brain serotonin which consists essentially of tryptophan in an amount effective to increase brain serotonin levels and melatonin.

4,687,764

HYPOTRIGLYCERIDEMICALLY ACTIVE POLYSACCHARIDES

Yasuo Kawai, Atsugi, and Kazunaga Yazawa, Sagamihara, both of Japan, assignors to Kabushiki Kaisha Advance Kaihatsu Kenkyujo, Tokyo, Japan

Filed Jul. 20, 1984, Ser. No. 632,844
Claims priority, application Japan, Jul. 27, 1983, 58-135982
Int. Cl.[4] A61K *31/71;* C07H *1/00*
U.S. Cl. 514—54 12 Claims

9. A method for reducing the blood triglyceride in mammals comprising *orally* administering to the mammals an effective amount of a hypotriglyceridemically active polysaccharide capable of reducing the blood triglyceride in mammals having the following characteristics:

(a) Specific rotatory power:
$[\alpha]_D^{29} = +190.1$
(1.8 w/v% solution)

(b) Molecular weight by gel filtration:
14,000±3,000

(c) Sugar composition (weight percent by gas chromatography)
glucose: 70.3
rhamnose: 13.7
uronic acid: 16.0

(d) Acid-base characteristics:
neutral polysaccharides.

4,687,765

METHOD AND COMPOSITION FOR THROMBOLYTIC TREATMENT

Edmond G. Vairel; Huguette Brouty-Boye; Francis Toulemonde, all of Paris, and Christian Doutremepuich, Bordeaux, all of France, assignors to Choay S.A., Paris, France

Continuation of Ser. No. 516,796, Jul. 25, 1983, abandoned. This application Jul. 30, 1985, Ser. No. 760,483
Int. Cl.[4] A61K *31/725*
U.S. Cl. 514—56 16 Claims

1. A method for the lysis of blood-thrombus comprising administering LMW heparin in an amount effective to exert thrombolysis in vivo.

4,687,766

PHARMACEUTICAL PREPARATION FOR THE THERAPEUTIC TREATMENT OF RHEUMATIC DISEASES

Armin Wendel, Cologne; Sigurd Leyck, Pulheim; Helmut Wetzig, Pulheim-Sinnersdorf; Jorg Hager, Cologne; Manfred Durr, Pulheim-Dansweiler, and Miklos Ghyczy, Cologne, all of Fed. Rep. of Germany, assignors to A. Natterman & Cie, GmbH, Cologne, Fed. Rep. of Germany

Filed Dec. 21, 1984, Ser. No. 685,152
Int. Cl.[4] A61K *31/655, 31/54*
U.S. Cl. 514—78 16 Claims

1. A pharmaceutical preparation for the treatment of rheumatic diseases, containing a phospholipid and a nonsteroidal antiphlogistic agent in a molar ratio of 1:1 to 20:1, comprising

(a) an inflammation inhibiting effective amount of an oxicam derivative which is piroxicam, isoxicam, tenoxicam or sudoxicam, and

(b) an effective gastric inflammation inhibiting amount of a 1,2-diacyl-glycero-3-phosphocholine wherein 75–86% by weight of the acyl radicals are unsaturated fatty acid radicals with a chain length of 16, 18 or 20 carbon atoms or their mixture.

4,687,767

CERTAIN 1-HYDROXYETHANE, 1,1-DI-PHOSPHONIC ACID DERIVATIVES USEFUL IN TREATING CALCIUM METABOLISM DISTURBANCES

Elmar Bosies, Weinheim, and Rudi Gall, Hirschberg, both of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

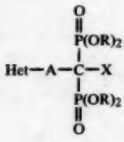
Filed Jul. 26, 1985, Ser. No. 759,608

Claims priority, application Fed. Rep. of Germany, Aug. 2, 1984, 3428524

Int. Cl.[4] **C07F** *9/58, 9/65;* **A61K** *31/44, 31/415*

U.S. Cl. 514—89 **12 Claims**

1. A diphosphonate compound of the formula:



(I)

wherein

Het is a substituted or unsubstituted heterocyclic selected from the group consisting of imidazole, or pyridine, 1,2,4- and wherein the substituents are selected from the group consisting of C_1–C_4 alkyl, C_1–C_4 alkoxy, halogen selected from the group consisting of fluorine, chlorine, bromine, iodine; hydroxyl, carboxyl, an amino group optionally substituted by C_1–C_4 alkyl or alkanoyl with up to 6 carbon atoms; benzyl and benzyl substituted by C_1–C_4 alkyl, nitro, amino or aminoalkyl with 1 to 4 carbon atoms,

A is a straight-chained or branched, saturated or unsaturated hydrocarbon chain containing 2 to 8 carbon atoms,

X is a hydrogen atom, hydroxy, or alkanoyl of up to 6 carbon atoms and R is a hydrogen atom or an alkyl of 1 to 4 carbon atoms; or a pharmacologically acceptable salt thereof.

10. A method for the treatment of calcium metabolism disturbances comprising administering to a mammal in need of said treatment an effective amount of a diphosphonate according to claim **1**.

4,687,768

CERTAIN HEXAHYDROINDAN-2,2-DIPHOSPHONIC ACIDS USEFUL IN TREATING DISEASES ASSOCIATED WITH ABNORMAL CALCIUM AND PHOSPHATE METABOLISM

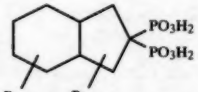
James J. Benedict, and Karen Y. Johnson, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Dec. 21, 1984, Ser. No. 684,544

Int. Cl.[4] **C07F** *9/38;* **A61K** *31/66*

U.S. Cl. 514—102 **4 Claims**

1. A hexahydroindan diphosphonic acid having the following structure:



wherein R_1 is one substituent selected from the group consisting of hydrogen, unsubstituted or substituted saturated alkyl having 1 to 6 carbon atoms, unsubstituted or substituted unsaturated alkyl having 2 to 6 carbon atoms, unsubstituted or substituted phenyl, unsubstituted or substituted naphthyl, unsubstituted or substituted benzyl, hydroxy, halogen, amino or amido, wherein substituted represents a substituent selected from the group consisting of methyl, methoxy, hydroxy, chloro, methylamino, dimethylamino or diethylamino, or a pharmaceutically acceptable salt thereof.

4,687,769

3-(3,3,3-TRIFLUOROPROPENYL) CEPHALOSPORINS

Yuichi Yamamoto, Yokohama; Takashi Yoshida; Shunzo Fukatsu, both of Tokyo, and Toshiyasu Ishimaru, Kawanishi, all of Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo, Japan

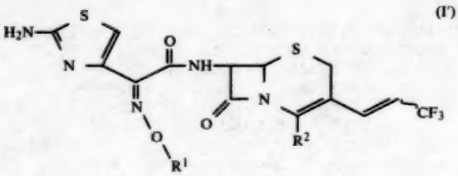
Filed Dec. 16, 1985, Ser. No. 809,168

Claims priority, application Japan, Dec. 20, 1984, 59-267382

Int. Cl.[4] **A61K** *31/545;* **C07D** *501/28*

U.S. Cl. 514—202 **11 Claims**

1. A cephem compound of the formula (I)



(I')

wherein R^1 is methyl group or carboxymethyl group and R^2 is carboxyl group or a carboxyl group, protected by a silyl group or by a diphenylmethyl group and a pharmaceutically acceptable salt or ester thereof.

11. A pharmaceutical, antibacterial composition which comprises an antibacterially effective amount of the compound of the formula (I) as defined in claim **1** or a pharmaceutically acceptable salt or ester thereof, as the active ingredient, in combination with a pharmaceutically acceptable carrier for the active ingredient.

4,687,770

ISOXAZOLO-PYRIDO-BENZOXAZINE AND ISOTHIAZOLO-PYRIDO-BENZOXAZINE DERIVATIVES

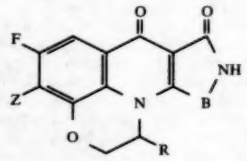
Daniel T. Chu, Vernon Hills, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Continuation-in-part of Ser. No. 812,560, Dec. 23, 1985, abandoned. This application Oct. 15, 1986, Ser. No. 919,045

Int. Cl.[4] **A61K** *31/535, 31/54;* **C07D** *498/14*

U.S. Cl. 514—211 **8 Claims**

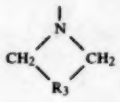
1. A compound having the formula



wherein B is selected from oxygen and sulfur, and R is C_1 to C_4 alkyl or $=CH_2$ and Z is selected from (a) a phenyl, (b) an amino group of the formula

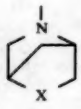
wherein R_1 is hydrogen, C_1 to C_4 alkyl, amino-substituted C_1 to C_4 alkyl, hydroxy-substituted C_1 to C_4 alkyl, and R_2 is selected from the group consisting of C_1 to C_4 alkyl, hydroxy-substituted C_1 to C_4 alkyl, an amino group, a mono-(C_1 to C_4)

alkylamino group and a di-(C_1 to C_4) alkylamino groups; (c) an aliphatic heterocyclic ring having the structure

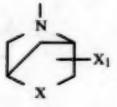


wherein R_3 is a group of formula $—(CH_2)_n—$ wherein n is 2 or 3 or a group of the formula $—(CH_2)_n—R_4—CH_2—$ wherein n is 1 or 2 and R_4 is selected from the group consisting of —S—, —O— and —NH—; substituted derivatives of the aliphatic heterocyclic ring substituted with one or more substituents selected from the group consisting of C_1 to C_4 alkyl, hydroxy-substituted C_1 to C_4 alkyl, hydroxy, amino-substituted C_1 to C_4 alkyl, phenyl, halophenyl, halogen, alkanoylamido containing 1 to 4 carbon atoms and an amino of the formula

wherein R_5 and R_6 are each independently selected from the group consisting of hydrogen, C_1 to C_4 alkyl; (d) a bicyclic heterocyclic ring having the formula



wherein X is selected from the group consisting of —S—, —O—, and —N—; and (e) bicyclic heterocyclic rings of the formula



wherein X_1 is one or more of C_1 to C_4 alkyl, hydroxy-substituted C_1 to C_4 alkyl, phenyl, halophenyl, amino-substituted C_1 to C_4 alkyl, hydroxy, halogen, alkanoylamido having 1 to 4 carbon atoms, an an amino of the formula

and pharmaceutically acceptable salts thereof.

8. A method of treating a bacterial infection in a patient comprising administering to a patient in need of such treatment a therapeutically effective amount of a compound as defined in claim 1.

4,687,771

METHOD FOR TREATMENT OF MALE IMPOTENCE

Donald E. Gamble; Harry L. Hunter, and Gordon R. McKinney, all of Evansville, Ind., assignors to Bristol-Myers Company, New York, N.Y.

Filed Nov. 1, 1985, Ser. No. 793,821
Int. Cl.[4] A61K *31/50*
U.S. Cl. 514—253 5 Claims

1. A method for treating male sexual impotence which comprises administering a non-toxic therapeutically effective dose of trazodone or a pharmaceutically acceptable acid addition salt thereof to a patient in need of such treatment.

4,687,772

METHOD FOR IMPROVEMENT OF SHORT TERM MEMORY

Marc T. Alderdice, Evansville, Ind., assignor to Bristol-Myers Company, New York, N.Y.

Filed Oct. 7, 1986, Ser. No. 916,661
Int. Cl.[4] A61K *31/505*
U.S. Cl. 514—273 7 Claims

1. A method for improving short term memory which comprises administering a non-toxic therapeutically effective dose of buspirone or a pharmaceutically acceptable acid addition salt thereof to a patient in need of such treatment.

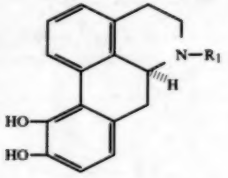
4,687,773

(+)-N-N-PROPYLNORAPOMORPHINE AND SELECTIVE LIMBIC ACTIVITY

John L. Neumeyer, Wayland, and Ross J. Baldessarini, Newton, both of Mass., assignors to McLean Hospital, Belmont and Northeastern University, Boston, both of, Mass.

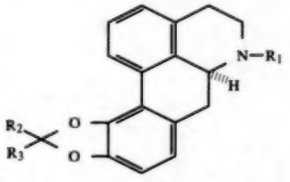
Continuation-in-part of Ser. No. 479,219, Mar. 28, 1983, abandoned. This application May 31, 1985, Ser. No. 739,612
Int. Cl.[4] A61K *31/47*; C07D *221/18, 491/06*
U.S. Cl. 514—280 12 Claims

1. The (S) enantiomers of compounds having the following structure:



wherein R_1 is lower alkyl of 2 to 6 carbon atoms, cycloalkyl of 3 to 8 carbon atoms, lower alkenyl, lower alkynyl, phenyl lower alkylene, phenyl lower alkenyl and phenyl lower alkynyl and pharmaceutically acceptable acid addition salts thereof.

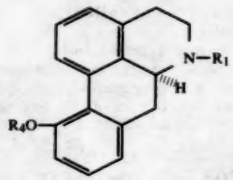
2. An orally effective compound being the (S) enantiomer of the structure



wherein R_1 is lower alkyl, of 2 to 6 carbon atoms, cycloalkyl of 3 to 8 carbon atoms, lower alkenyl, lower alkynyl, phenyl lower alkylene, phenyl lower alkenyl, and phenyl lower alky-

nyl and R_2 and R_3 are hydrogen, methyl, or R_1, and pharmaceutically acceptable acid addition salts thereof.

7. The (S) enantiomers of compounds having the following structure:



wherein R_1 is lower alkyl, of 2 to 6 carbon atoms, cycloalkyl of 3 to 8 carbon atoms, lower alkenyl, lower alkynyl, phenyl lower alkylene, phenyl lower alkenyl and phenyl lower alkynyl and pharmaceutically acceptable acid addition salts thereof and R_4 is hydrogen, methyl, lower alkyl or R^1CO where R^1=methyl or lower alkyl.

10. A method for selectively exerting antipsychotic or sedative effects in the limbic region comprising administering a therapeutically effective amount of a pharmaceutical composition of the compound of claims 1, 2, 3, 4, 5, 6, 7, 8 or 9.

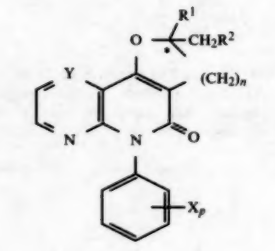
4,687,774

METHOD FOR SUPPRESSING THE IMMUNE RESPONSE

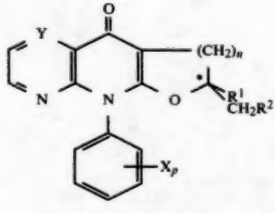
Sidney R. Smith, Ridgewood, and Marvin I. Siegel, Woodbridge, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed Mar. 10, 1986, Ser. No. 836,357
Int. Cl.[4] A61K *31/44, 31/50*
U.S. Cl. 514—293 **18 Claims**

1. A method of suppressing the immune response in a mammal which comprises administering to a mammal in need of such treatment an immunosuppressing effective amount of a compound having the structural formulae I, II or III:

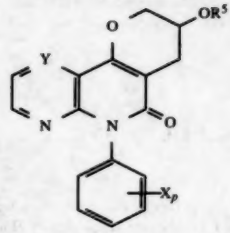


I



II

-continued



III

or pharmaceutical acceptable salt thereof, wherein n is 1 or 2;

R^1 and R^2 may be combined to form a bond, or R^1 is hydrogen and R^2 is OR, halogen or NR^3R^4;

R is hydrogen, carboxylic acyl having from 2 to 10 carbon atoms, or carbamyl;

R^3 and R^4 may be the same or different and each is independently hydrogen or alkyl having from 1 to 6 carbon atoms, or R^3 and R^4 may be combined with the nitrogen to which they are attached to form a pyrrolidino, piperidino, morpholino, or piperazino ring;

R^5 is hydrogen or carboxylic acyl having from 2 to 10 carbon atoms;

each X substituent is independently selected from hydroxy, alkyl having 1 to 6 carbon atoms, alkoxy having from 1 to 6 carbon atoms, nitro, halogen, trifluoromethyl, or alkyl—$S(O)_m$ having from 1 to 6 carbon atoms and wherein m is 0, 1 or 2;

p is 0, 1, 2 or 3; and

Y is CH or N.

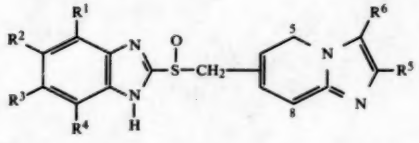
4,687,775

2-[(IMIDAZO[1,2-A]PYRIDINYLMETHYL)SULFINYL]-1H-BENZIMIDAZOLES

Gilbert W. Adelstein, Evanston; Alan E. Moormann, Skokie, and Stella S. T. Yu, Morton Grove, all of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Jul. 17, 1986, Ser. No. 887,842
Int. Cl.[4] A61K *31/435;* **C07D** *471/04*
U.S. Cl. 514—300 **18 Claims**

1. A compound of the formula:



or the pharmaceutically acceptable acid addition salts thereof; or the pharmaceutically acceptable base addition salts thereof; wherein R^1, R^2, R^3, and R^4 are independently:

(a) hydrogen;
(b) C_1–C_{10} alkyl;
(c) C_1–C_6 alkoxy;
(d) C_1–C_4 fluorinated alkyl; or
(e) halogen; and

wherein R^5 and R^6 are independently:

(a) hydrogen;
(b) C_1–C_{10} alkyl; or
(c) phenyl or phenyl substituted with 1 to 3 substituents selected from the group:
(i) C_1–C_{10} alkyl;
(ii) C_1–C_6 alkoxy;
(iii) C_1–C_4 fluorinated alkyl;
(iv) halogen;

(v) nitro, with the proviso that only one such substituent may be nitro; or

(vi) C_2–C_6 alkoxycarbonyl.

16. A method for treating ulcers in mammals comprising administering a therapeutically effective amount of at least one compound of claim 1 to a mammal in need of such treatment.

4,687,776

DRUG STABILIZATION

Li Hang Chow, Whippany; Mahdi B. Fawzi, Flanders, and Isaac Ghebre-Sellassie, Stanhope, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

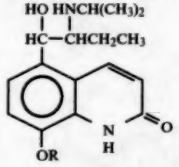
Filed Oct. 24, 1986, Ser. No. 922,646

Int. Cl.[4] C07D *215/22*

U.S. Cl. 514—312 4 Claims

1. A process for stabilizing procaterol comprising the steps of:

(1) contacting at least one of procaterol or a pharmaceutically acceptable salt thereof with a suitable reagent to produce a derivative which conforms to the formula:



wherein R is a C_{2-10} alkyl aralkyl, alkaryl, or acyl group; and

(2) recovering that derivative.

4,687,777

THIAZOLIDINEDIONE DERIVATIVES, USEFUL AS ANTIDIABETIC AGENTS

Kanji Meguro, Nishinomiya, and Takeshi Fujita, Takarazuka, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

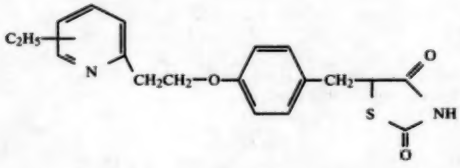
Filed Jan. 17, 1986, Ser. No. 820,390

Claims priority, application Japan, Jan. 19, 1985, 60-8085

Int. Cl.[4] A61K *31/44*; C07D *417/04*

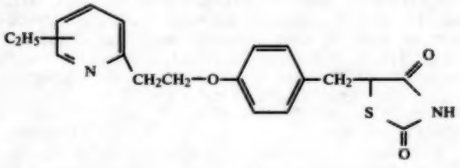
U.S. Cl. 514—342 5 Claims

1. A compound of the formula:



or a pharmacologically acceptable salt thereof.

5. An antidiabetic composition which consists essentially of a compound of the formula:



or a pharmacologically acceptable salt thereof, in association with a pharmacologically acceptable carrier, excipient or diluent.

4,687,778

ANTI-AMNESTIC AGENT

Daisuke Tsuru; Tadashi Yoshimoto, both of Nagasaki; Hisao Hagiwara, and Kunio Kado, both of Tokyo, all of Japan, assignors to Kabushiki Kaisha Yakult Honsha, Tokyo, Japan

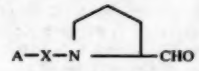
Filed Mar. 8, 1985, Ser. No. 709,682

Claims priority, application Japan, Mar. 9, 1984, 59-43751

Int. Cl.[4] A61K *31/40*

U.S. Cl. 514—419 6 Claims

1. A method for treating a memory disorder comprising administering to a patient an effective amount of at least one prolinal derivative of the formula



wherein A is an amino protecting group selected from the group consisting of N-benzyloxycarbonyl, t-butyloxycarbonyl and C_{2-4} acyl and X is a member selected from the group consisting of alanine, glycine, phenylalanine, proline, valine, leucine, serine and tyrosine.

4,687,779

CHROMANOL DERIVATIVES

John M. Evans, Roydon, England, assignor to Beecham Group p.l.c., England

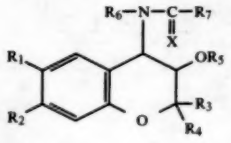
Filed Aug. 29, 1984, Ser. No. 645,492

Claims priority, application United Kingdom, Sep. 1, 1983, 8323417; Dec. 24, 1983, 8334497

Int. Cl.[4] C07D *405/04*, *311/68*; A61K *31/35*, *31/40*

U.S. Cl. 514—456 8 Claims

1. A compound of formula (I)



(I)

wherein:

either one of R_1 and R_2 is hydrogen and the other is C_{1-6} alkylcarbonyl, C_{1-6} alkoxycarbonyl, C_{1-6} alkylcarbonyloxy, C_{1-6} alkylhydroxymethyl, nitro, cyano, chloro, trifuoromethyl, C_{1-6} alkylsulphinyl, C_{1-6} alkylsulphonyl, C_{1-6} alkoxysulphinyl, C_{1-6} alkoxysulphonyl, C_{1-6} alkylcarbonylamino, C_{1-6} alkoxycarbonylamino, C_{1-6} alkylthiocarbonyl, C_{1-6} alkoxy-thiocarbonyl, C_{1-6} alkyl-thiocarbonyloxy, C_{1-6} alkyl-thiolmethyl, formyl or aminosulphinyl, aminosulphonyl or aminocarbonyl, the amino moiety being unsubstituted or substituted by one or two C_{1-6} alkyl groups, or C_{1-6} alkylsulphinylamino, C_{1-6} alkylsulphonylamino, C_{1-6} alkoxysulphinylamino or C_{1-6} alkoxysulphonylamino or ethylenyl terminally substituted by C_{1-6} alkylcarbonyl, nitro or cyano, or —C(C_{1-6} alkyl)-NOH or —C(C_{1-6} alkyl)NNH_2, or one of R_1 and R_2 is nitro, cyano or C_{1-3} alkylcarbonyl and the other is methoxy or amino unsubstituted or substituted by one or two C_{1-6} alkyl or C_{2-7} alkanoyl; one of R_3 and R_4 is hydrogen or C_{1-4} alkyl and the other is C_{1-4} alkyl or R_3 and R_4 together are C_{2-5} polymethylene;

R_5 is hydrogen, C_{1-3} alkyl or C_{1-8} acyl;

R_6 is hydrogen or C_{1-6} alkyl; and

R_7 is hydrogen, C_{1-6} alkyl unsubstituted or substituted by

hydroxy, C_{1-6} alkoxy, C_{1-6} alkoxycarbonyl or carboxy, C_{1-6} alkyl substituted by halogen or C_{2-6} alkenyl; C_{1-6} alkyl substituted by amino unsubstituted or substituted by one or two C_{1-6} alkyl groups which may be the same or different; amino unsubstituted or substituted by a C_{1-6} alkyl or C_{1-6} alkenyl group or by a C_{1-6} alkanoyl group unsubstituted or substituted by up to three halo atoms, by a phenyl group unsubstituted or substituted by C_{1-6} alkyl, C_{1-6} alkoxy or halogen; or C_{1-6} alkoxy, or phenoxy unsubstituted or substituted by C_{1-6} alkyl, C_{1-6} alkoxy or halogen; phenyl or naphthyl, either being unsubstituted or substituted by one or more C_{1-6} alkyl, C_{1-6} alkoxy, fluoro, chloro or bromo, trifluoromethyl, nitro, cyano, acetyl, propionyl and benzoyl, or amino or aminocarbonyl unsubstituted or substituted by one or two C_{1-6} alkyl; or, when X is oxygen, R_7 is carboxy, C_{1-6} alkoxycarbonyl, aminocarbonyl unsubstituted or substituted by one or two C_{1-6} alkyl groups which may be the same or different; or

R_6 and R_7 together are C_{3-4} polymethylene;

X is oxygen or sulphur; and the R_6NCXR_7 and OR_5 moieties are cis or, when one or the other of R_1 and R_2 and/or R_7 is an amino or an amino-containing group, a pharmaceutically acceptable salt thereof.

8. A method of treating hypertension in mammals, which comprises administering to a mammal in need thereof an antihypertensive effective amount of a compound according to claim 1 or a pharmaceutically acceptable salt thereof.

4,687,780

ANTI-TUMOR COMPOUNDS OF PLATINUM

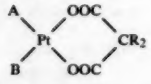
Christopher F. J. Barnard, Reading, England, assignor to Johnson Matthey PLC, London, England

Filed Jun. 18, 1985, Ser. No. 746,155

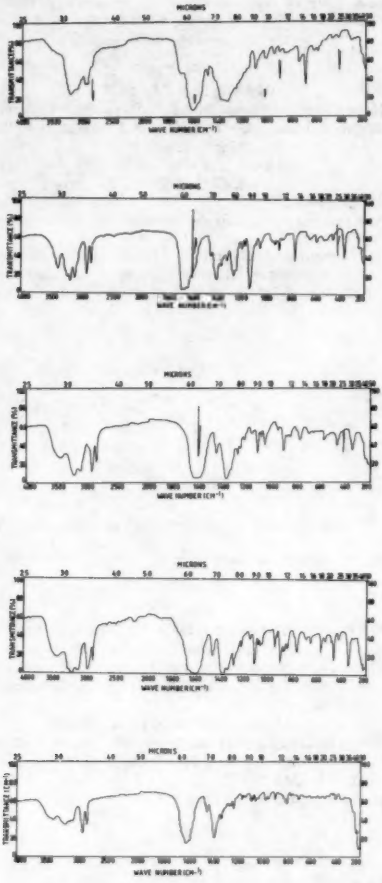
Int. Cl.[4] A01N *55/04;* **A61K** *31/32;* **C07F** *15/00*

U.S. Cl. 514—492 **7 Claims**

1. A co-ordination compound of platinum having the general formula



in which the A moiety is ammine and B is cycloalkylamine, and the R moieties are the same or different and are selected from H, lower alkyl, aryl, aralkyl, alkenyl, cycloalkyl, cycloalkenyl, alkoxy and OH or are combined with the host carbon atom to form a cycloalkyl or cycloalkenyl group.



4,687,781

ANALGESIC AND ANTI-INFLAMMATORY COMPOSITIONS

Seymour Ehrenpreis, Skokie; Joseph E. Comaty, and Reuben C. Balagot, Chicago, all of Ill., assignors to Endorfin, Inc., Chicago, Ill.

Continuation of Ser. No. 657,732, Oct. 4, 1984, abandoned, which is a continuation-in-part of Ser. No. 394,698, Jul. 2, 1982, abandoned, which is a division of Ser. No. 75,663, Sep. 14, 1979, Pat. No. 4,439,452, which is a continuation-in-part of Ser. No. 12,043, Feb. 14, 1979, abandoned, which is a continuation-in-part of Ser. No. 882,975, Mar. 3, 1978, abandoned. This application May 22, 1986, Ser. No. 866,119

Int. Cl.[4] A61K *31/19, 31/195*

U.S. Cl. 514—557 **14 Claims**

1. An analgesic composition comprising a therapeutically effective amount of an analgesic agent selected from the group consisting of D-phenylalanine, DL-phenylalanine, D-leucine

and DL-leucine and a synergistically effective amount of an anti-pyretic, anti-inflammatory agent selected from the group consisting of ibuprofen, naproxen, ketoprofen, fenaprofen and diclofenac or a pharmaceutically acceptable salt thereof.

4,687,782

NUTRITIONAL COMPOSITION FOR ENHANCING SKELETAL MUSCLE ADAPTATION TO EXERCISE TRAINING

Eugene R. Brantman, Richardson, Tex., assignor to Nutri-Fuels Systems, Inc., Garland, Tex.

Filed Dec. 10, 1984, Ser. No. 680,161

Int. Cl.[4] A61U *31/195; A61K 31/195*

U.S. Cl. 514—561 **24 Claims**

1. A method of supplementing the diet of a athlete, comprising the steps of: providing the athlete with a solution comprising an amino acid mixture consisting essentially of 0.025 grams L-carnitine, 0.5 grams L-glutamine, 0.625 grams L-isoleucine, 0.85 grams L-leucine and 0.625 grams L-valine mixed with 400 milliliters of water; and having the athlete drink the solution.

4,687,783

FATTY ALDEHYDES AND ACIDS IN THE TREATMENT OF NEUROLOGICAL AND DERMATOLOGICAL DISEASES

Wilhelm Hörrmann, Staltacherstr. 34, D 8127 Iffeldorf, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 470,969, Mar. 1, 1983, Pat. No. 4,613,621, which is a continuation-in-part of Ser. No. 321,187, Sep. 18, 1981, abandoned, which is a continuation-in-part of Ser. No. 127,817, Mar. 6, 1980, abandoned, which is a continuation-in-part of Ser. No. 29,850, Apr. 13, 1979, abandoned, which is a continuation-in-part of Ser. No. 907,343, May 18, 1978, abandoned, which is a continuation-in-part of Ser. No. 787,902, Apr. 15, 1977, abandoned, which is a continuation-in-part of Ser. No. 682,309, May 3, 1976, abandoned, which is a continuation-in-part of Ser. No. 600,375, Jul. 30, 1975, abandoned, which is a continuation-in-part of Ser. No. 450,458, Mar. 12, 1974, abandoned, which is a continuation-in-part of Ser. No. 274,754, Jul. 24, 1972, abandoned, which is a continuation-in-part of Ser. No. 805,934, Feb. 12, 1969, abandoned, which is a continuation-in-part of Ser. No. 634,884, May 1, 1967, abandoned, which is a continuation-in-part of Ser. No. 412,862, Nov. 20, 1964, abandoned, which is a continuation-in-part of Ser. No. 211,827, Jul. 23, 1962, abandoned, which is a continuation-in-part of Ser. No. 824,798, Jul. 3, 1959, abandoned. This application Mar. 10, 1986, Ser. No. 837,969

Int. Cl.[4] A61K *31/11*

U.S. Cl. 514—693 **1 Claim**

1. A method of treating shaking paralysis or schizophrenia in a patient having shaking paralysis or schizophrenia administering to that patient 100–400 mg/kg daily of at least one of the geometric and optical isomers of
6-n-dodecenoic aldehyde
8-n-hexadecenoic aldehyde and
6, 12-n-octadecadienoic aldehyde or
8, 16-n-tetracosadienoic-2-hydroxy aldehyde or
8, 16-n-tetracosadienoic-2-hydroxy acid
per se or as an ether or ester of ethanol or physiologic acid of bile or in form of lipid especially plasmalogen said isomer being diluted in plant oils or in the form of capsule or emulsion.

4,687,784

CO HYDROGENATION WITH MOLYBDENUM OF WIDE-PORE CARBON CATALYSTS

Henry C. Foley, East Norwalk, and Michael P. O'Toole, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 698,060, Feb. 4, 1985, Pat. No. 4,591,578. This application Jan. 13, 1986, Ser. No. 817,952

Int. Cl.[4] C07C *1/04*

U.S. Cl. 518—714 **4 Claims**

1. A process which comprises contacting a stoichiometric reaction mixture of H_2 and CO with catalyst particles comprising catalytic molybdenum supported on particulate carbon which has a pore size distribution curve characterized by a single sharp peak at a pore radius about 10 Å, surface area greater than 100 square meters per gram, pore volume greater than 0.2 cc/g, average pore radius of at least 25 Å and compacted bulk density in the range from about 0.3 to about 0.8 g/cc under conditions for synthesis of aliphatic hydrocarbons from the reaction mixture and wherein the catalyst is made by vapor deposition of $MoCO_6$ on the defined carbon particles and heating to decompose and reduce the molybdenum compound.

4,687,785

THERMALLY ADAPTIVE POLYMERS AND PREPOLYMERS AND METHODS OF MAKING IN WHICH AN IMIDE IS FORMED FROM A POLYANHYDRIDE OLIGOMER AND AN ISOCYANATE

John A. Parker, Los Altos, Calif.; Rubin Feldman, Ladue, and Robert L. Bryant, Webster Groves, both of Mo., assignors to Thermal Science, Inc., St. Louis, Mo.

Filed Aug. 27, 1985, Ser. No. 769,863

Int. Cl.[4] C08G *18/14*

U.S. Cl. 521—106 **59 Claims**

1. A polymeric foam consisting of repetitive units, each of said units comprising an imide linkage and an amic acid group, said amic acid group consisting of a carboxyl group and a singly substituted amide linkage attached to adjacent carbon atoms.

4,687,786

PROCESS FOR THE PREPARATION OF FLEXIBLE POLYURETHANE FOAMS

Hans-Joachim Kollmeier, Essen, and Rolf-Dieter Langenhagen, Hattingen-Niederwenigern, both of Fed. Rep. of Germany, assignors to Th. Goldschmidt AG

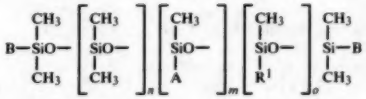
Filed Feb. 27, 1986, Ser. No. 833,957

Claims priority, application Fed. Rep. of Germany, Mar. 8, 1985, 3508292

Int. Cl.[4] C08J *9/00, 9/08*

U.S. Cl. 521—110 **21 Claims**

1. In a process for the preparation of flexible polyurethane foams by reacting at least difunctional polyisocyanates, polyols with at least two hydroxyl groups per molecule, the equivalent weight of which per hydroxyl group is about 700 to 1,500, in the presence of catalysts, blowing agents and foam stabilizers composed of polysiloxane-polyoxyalkylene block copolymers, the improvement which comprises the polysiloxane-polyoxyalkylene block copolymers having the formula:



wherein

A represents A^1 and A^2 polyoxyalkylene blocks which are linked to silicon over carbon and which have the formula

$$-R^2-O-(C_xH_{2x}O-)_nR^3,$$

R^2 being a divalent hydrocarbon radical with 2 to 4 carbon atoms,

B is a methyl radical, the A or the R^1 radical,

R^1 is an alkyl radical with 1 to 12 carbon atoms, a substituted alkyl radical with 1 to 12 carbon atoms, an aryl or an alkaryl radical,

n has a value of from 30 to 200,

m has a value of 3 to 20 when B is methyl or the R^1 radical, and a value of 1 to 18, if B corresponds to the A radical,

o has a value of 0 to 40, wherein

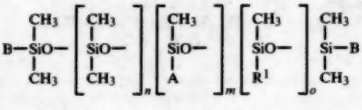
n is not less than 5 m, and o is not greater than ½ n, with the proviso that

(a) the A^1blocks consist of 30 to 60 weight percent of oxyethylene units, the remainder being oxypropylene units, the R^3radical is a hydrogen radical and x and y are such that the average molecular weight of the A^1 blocks is from 2,500 to 4,500,

(b) the A^2 blocks consist of 30 to 80 weight percent of oxyethylene units, the remainder being oxypropylene units, the R^3 radical is an alkyl radical with 1 to 4 carbon atoms or an acyl radical and x and y are such that the average molecular weight of the A^2 blocks is from 800 to 2,400, and

(c) the molar ratio of the A^1 blocks to the A^2 blocks is 20:80 to 60:40, and there is at least one A^1 and one A^2 block in the average molecule.

20. A stabilizer comprising polysiloxane-polyoxyalkylene block copolymers having the formula:



wherein

A represents A^1 and A^2polyoxyalkylene blocks which are linked to silicon over carbon and which have the formula

$$-R^2-O-(C_xH_{2x}O-)_yR^3,$$

R^2 being a divalent hydrocarbon radical with 2 to 4 carbon atoms,

B is a methyl radical, the A or the R^1 radical,

R^1 is an alkyl radical with 1 to 12 carbon atoms, a substituted alkyl radical with 1 to 12 carbon atoms, an aryl or an alkyarlyl radical,

n has a value of from 30 to 200,

m has a value of 3 to 20 when B is methyl the R^1 radical, and a value of 1 to 18, if B corresponds to the A radical,

o has a value of 0 to 40, wherein n is not less than 5 m, and 0 is not greater than ½ n,

with the proviso that

(a) the A^1 blocks consist of 30 to 60 weight percent of oxyethylene units, the remainder being oxypropylene units, the R^3 radical is a hydrogen radical and x and y are such that the average molecular weight of the A^1 blocks is from 2,500 to 4,500,

(b) the A^2 blocks consist of 30 to 80 weight percent of oxyethylene units, the remainder being oxypropylene units, the R^3 radical is an alkyl radical with 1 to 4 carbon atoms or an acyl radical and x and y are such that the average molecular weight of the A^2 blocks is from 800 to 2,400, and

(c) the molar ratio of the A^1 blocks to the A^2 blocks is 20:80 to 60:40, and there is at least one A^1 and one A^2 block in the average molecule.

4,687,787

FOAMING SYSTEM FOR PHENOLIC FOAMS

Leon M. Zwolinski, Orchard Park, and Frank J. Dwyer, Buffalo, both of N.Y., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Dec. 20, 1985, Ser. No. 811,185

Int. Cl.[4] C08J *9/14*

U.S. Cl. 521—131 **3 Claims**

1. A method of enchancing the solubility of trichlorotrifluoroethane blowing agent in the production of foamable rigid phenol formaldehyde which comprises:

(a) blending dichlorotrifluoroethane with the trichlorotrifluoroethane in a ratio of about 1:9 to about 3:7 and wherein the total blowing agent is present in amounts of from about 2 to 40 parts by weight based on the weight of the phenol formaldehyde resin, and in admixture with phenol formaldehyde until the fluorocarbon is homogeneously dispersed in the phenol formaldehyde resin, and

(b) foaming the blend of (a) until the fluorocarbon is substantially entirely volatilized to produce a rigid cellular foam.

4,687,788

DIMENSIONALLY STABLE URETHANE ELASTOMERS

Douglas K. Hillshafer, and Robert B. Turner, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 433,595, Oct. 8, 1982, abandoned. This application Nov. 25, 1983, Ser. No. 555,328

Int. Cl.[4] C08G *18/14*

U.S. Cl. 521—163 **14 Claims**

1. A urethane elastomer prepared from a composition comprising (A) a high equivalent weight polyether polyol or polyol mixture which contains less than about 10 percent by weight oxyethylene moities and which contains at least about 10 percent by weight oxybutylene moities, (B) at least one chain extender and (C) at least one polyisocyanate or polyisothiocyanate and wherein said urethane elastomer has a percent linear dimensional change after being immersed in deionized water for 240 hours (864000 s) at 72° F. (22.2° C.) of less than about 0.6%, said linear dimensional change being the average value of at least 2 specimens of the dimension 6"×1"×¼" (15.24 cm×2.54 cm×0.3175 cm) which have been post heated at 158° F. (70° C..) for 24 hours (86400 s) followed by cooling in a dry box for 3 hours (10800 s) at 72° F. (22.2° C..) prior to immersion in said deionized water.

4,687,789

WATER SOLUBLE DISPERSANT FOR WATER-BASED PIGMENT COMPOUNDS COMPRISING A TERPOLYMER OF ACRYLIC ACID METHACRYLIC ACID AND ITACONIC ACID

Olivier Gonnet, St Andre-de-Corcy, and Jacky Rousset, St Trivier-sur-Moignans, both of France, assignors to Coatex S.A., Caluire, France

Continuation of Ser. No. 739,704, May 31, 1985, abandoned. This application Mar. 4, 1986, Ser. No. 837,575

Claims priority, application France, Dec. 3, 1984, 84 18579

Int. Cl.[4] C08F *220/06, 6/14*; C08K *3/10, 9/02*

U.S. Cl. 523—122 **20 Claims**

1. A process for the preparation of an aqueous pigment composition comprising:

forming an aqueous dispersion containing a liquid emulsion of a polymer free of protective colloids and having a high density of anionic groups, of pigments containing metal ions, with a water-soluble dispersant which is a copolymer of acrylic acid, methacrylic acid and itaconic acid, the said dispersant having reactive carboxylate groups which can bond with the metal ions of said pigment while inhibiting their reaction with the emulsion polymer and said dispersant conferring on said aqueous pigment composition definable rheological characteristics which can be established beforehand and which remain stable over a period of time.

4,687,790

MINE STOPPING CAULK

Gregory Andreichuk, Clearwater, Fla., assignor to The Celotex Corporation, Tampa, Fla.

Continuation-in-part of Ser. No. 739,251, May 30, 1985, Pat. No. 4,596,838. This application Jun. 4, 1986, Ser. No. 870,605

Int. Cl.[4] C08K *3/34*

U.S. Cl. 523—130 **20 Claims**

1. A process for sealing geological formations and mine stoppings comprising applying to said substrates an aqueous, non-cementitious caulk composition comprising 3 to 40% by

weight of alkali metal silicate; 30 to 65% by weight of filler material containing at least one component selected from the group consisting of silica, a silicate other than alkali metal silicate, and mixtures thereof; 1.5 to 12% by weight of a water-soluble or water-dispersible polymer; and 12 to 55% by weight of water, and allowing said caulk composition to dry to form an air flow resistant seal on said substrates.

4,687,791

ERASABLE BALL-POINT PEN INK

Tamotsu Miyajima; Noriatsu Tanaka, both of Kanagawa, and Nobuto Saito, Gunma, all of Japan, assignors to Pilot Man-Hitsu Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 31, 1983, Ser. No. 547,283
Claims priority, application Japan, Oct. 29, 1982, 57-189087
Int. Cl.[4] C09D *11/18*
U.S. Cl. 523—161 **16 Claims**

1. An erasable ball-point pen ink, comprising:

a rubber component selected from the group consisting of a synthetic rubber of the cis-1,4-polyisoprene series or a styrene-butadiene copolymer;

a volatile solvent selected from the group consisting of n-hexane, iso-hexane, n-heptane, n-octane, iso-octane, n-decane, solvent naptha, heavy naptha, kerosene, ligroin, benzene, toluene, xylene or a mixture thereof;

a pigment selected from the group consisting of carbon black, graphite, prussion blue, iron oxide, or an organic pigment of the azo, anthraquinone, phthalocyanine or triphenylmethane series; and

a nonvolatile solvent selected from the group consisting of petroleum lubricating oils, dioctyl phthalate, dioctyl adipate, dibutyl phthalate or oleic acid,

and which additionally comprises:

fine powders of silicon dioxide formed by the hydrolysis of silicon tetrachloride by a high temperature gas phase reaction; or

a combination of fine powders of silicon dioxide formed by the hydrolysis of silicon tetrachloride by a high temperature gas phase reaction and a semisolid substance; or

a combination of fine powders of silicon dioxide formed by the hydrolysis of silicon tetrachloride by a high temperature gas phase reaction and a soft solid substance having a melting point not higher than 130° C.

4,687,792

ERODIBLE SHIP-BOTTOM PAINTS FOR CONTROL OF MARINE FOULING

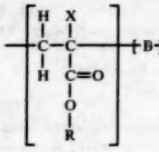
David B. Russell, Piscataway; Melvin H. Gitlitz, Edison; Howard H. Leiner, Cranbury; Mo A. Khuddus, Matawan, and Abe Berger, Summit, all of N.J., assignors to M&T Chemicals Inc., Woodbridge, N.J.

Division of Ser. No. 619,167, Jan. 17, 1984, Pat. No. 4,594,365, which is a continuation-in-part of Ser. No. 458,377, Jan. 17, 1983, abandoned. This application Jan. 29, 1985, Ser. No. 695,985
Int. Cl.[4] C08L *31/00, 31/02;* C09D *5/14*
U.S. Cl. 523—177 **14 Claims**

1. An antifouling paint for protecting marine surfaces, comprising in combination:

(a) toxicant and

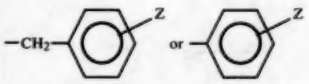
(b) a film forming water insoluble, seawater erodible polymeric binder having recurring groups represented by the formula



wherein

X is H or CH_3;

R is represented by the formula



wherein

Z is NO_2, halogen or CN, and

where B is the residue of an ethylenically unsaturated monomer, and

wherein said polymer has an hydrolysis rate of at least 5×10^{-4} milliequivalents per hour whereby the paint has an erosion rate of at least 2 microns per month in seawater.

4,687,793

THERMOPLASTIC RESINS CONTAINING GLOXAL HEAT TREATED CELLULOSIC FILLERS

Tsutomu Motegi, Sodegaura; Kazuo Aoki, Chiba, and Kazuhiro Kimura, Ichihara, all of Japan, assignors to Chisso Corporation, Osaka, Japan

Filed Dec. 3, 1985, Ser. No. 804,142
Claims priority, application Japan, Dec. 25, 1984, 59-275429
Int. Cl.[4] C08K *9/04, 5/07;* C08L *1/00*
U.S. Cl. 523—200 **4 Claims**

1. A cellulosic filler for thermoplastic resin compositions comprising an untreated cellulosic filler selected from the group consisting of wood flour, wood chips, rice hulls, used paper, pulp, cellulose powder and mixtures thereof heat-mixed with glyoxal at 80° to 150° C. for 1 to 60 minutes to produce a cellulosic filler having almost no moisture.

4,687,794

NOVEL SYSTEM FOR PREPARING RUBBER COMPOSITIONS EMPLOYING A CAVITY TRANSFER MIXER

Elwyn Huddleston, Franklin, Ky., and Richard J. Lacana, Walpole, Mass., assignors to The Kendall Company, Boston, Mass.

Filed Aug. 1, 1986, Ser. No. 892,677
Int. Cl.[4] C08J *3/22*
U.S. Cl. 523—351 **20 Claims**

1. Process for preparing a rubber composition including at least one tackifying resin wherein components of said composition are first incorporated to form a rubber premix, and said tackifying resin is then incorporated in said premix in a separate mixing operation;

the improvements wherein said tackifying resin is incorporated in said premix in a cavity transfer mixer to form said rubber composition.

4,687,795

POLYESTER MOLDING COMPOSITIONS

Steven R. Dunkle, Flanders, N.J., and John C. Haylock, Dennysville, Me., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Dec. 24, 1984, Ser. No. 685,813
Int. Cl.[4] C08K 5/09
U.S. Cl. 523—436 13 Claims

1. A composition comprising poly(ethylene terephthalate); a crystallization enhacing amount from about 0.5 to about 2.0 percent, based on the weight of the poly(ethylene terephthalate), of a sodium salt of salicylic acid;

from 30 to 150 percent filler based on the weight poly(ethylene terephthalate); and

from 2 to 15 percent plasticizer based on the weight of poly(ethylene terephthalate).

4,687,796

OPTIMUM FORMULATION REGIONS OF REINFORCED THERMOSET COMPOSITES

David S. Cordova, Midlothian, Va.; Hugh H. Rowan, Chapel Hill, N.C., and Leroy C. Lin, Richmond, Va., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Dec. 23, 1985, Ser. No. 812,548
Int. Cl.[4] C08K 7/14
U.S. Cl. 523—466 4 Claims

1. A reinforced thermosetting resin composite characterized by enhanced impact strength at high particulate filler loadings comprising:

(a) 15 to 23 weight percent resin matrix selected from the group consisting of polyester and epoxy;

(b) 5 to 25 equivalent weight percent fiber reinforcement, said fiber reinforcement comprising 20 to 80 volume percent glass fiber and 80 to 20 volume percent high tenacity reinforcing polyethylene terephthalate fiber characterized by a thermal shrinkage of up to about 11 percent, a modulus after cure of at least about 50 grams per denier, and a tenacity of at least 5.5 grams per denier; and

(c) 80 to 52 weight percent particulate filler.

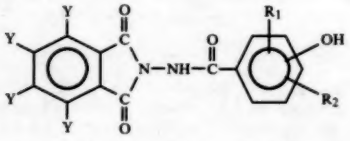
4,687,797

HALO PHTHALIMIDES OF PHENOLIC-SUBSTITUTED HYDRAZIDES

Ralph H. Hansen, Lincoln, Mass., assignor to Canusa Coating Systems Limited, Rexdale, Canada

Continuation of Ser. No. 715,011, Mar. 22, 1985, abandoned, which is a continuation of Ser. No. 536,341, Sep. 27, 1983, Pat. No. 4,520,146. This application Sep. 2, 1986, Ser. No. 901,974
Int. Cl.[4] C07D 209/48; C08K 5/34
U.S. Cl. 524—94 6 Claims

1. The compound of the formula I



where Y is Cl or Br; R_1 is tert-butyl and R_2 is H or lower alkyl of 1 to 4 carbons.

3. A composition comprising a polymer and the compound of claim 1 in an amount sufficient to impart flame retardant and antioxidant properties.

4,687,798

SOLVENT CEMENT

Lloyd H. King, Sr., 5222 Green Farms Rd., Edina, Minn. 55436

Filed Jan. 27, 1986, Ser. No. 822,861
Int. Cl.[4] C08K 5/34
U.S. Cl. 524—100 6 Claims

1. A solvent cement for joining water insoluble polymers wherein the solvent cement exceeds the standard specified in ASTM Bulletin D-2564-80, comprising about 10 to 15% of a water soluble polymer, a solvent comprised of ethyl acetate and N-methyl-2-pyrrolidone with ethyl acetate ranging from about 3% by weight to about 50% by weight, with the balance N-methyl-2-pyrrolidone.

4,687,799

COMPOSITIONS OF POLYPHENYLENE OXIDE OR OF MIXTURES OF POLYPHENYLENE OXIDE WITH A STYRENE POLYMER

Wanda Kosinska; Dorota Grzelak; Irena Penczek, and Jan Bialy, all of Warsaw, Poland, assignors to Enichem, S.p.A., Milan, Italy

Continuation of Ser. No. 677,229, Dec. 3, 1984, abandoned. This application Sep. 26, 1986, Ser. No. 911,788
Claims priority, application Italy, Dec. 5, 1983, 24023 A/83
Int. Cl.[4] C08K 5/11, 5/34
U.S. Cl. 524—100 6 Claims

1. Thermally stable compositions, also showing characteristics of high fluidity in the molten state, comprising polyphenylene oxide, or blends of polyphenylene oxide with a styrene polymer, and a stabilizer system consisting of 2,4-bis(n-octylthio)-6-(4-hydroxy-3,5-di-tert.butylanilino)-1,3,5-triazine and dilauryl thiopropanoate, said components of the stabilizer system being each present in a quantity of from 0.1 to 3 parts by weight per 100 parts by weight of polymer or of polymer blend.

4,687,800

TARTRATE-BASED LIGHT STABILIZERS FOR PLASTICS

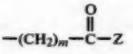
Richard V. Nelson, Wilmington, Del., and John F. Stephen, West Chester, Pa., assignors to ICI Americas Inc., Wilmington, Del.

Continuation of Ser. No. 786,799, Oct. 11, 1985, abandoned. This application Sep. 2, 1986, Ser. No. 902,797
Int. Cl.[4] C07D 405/12, 405/14; C08K 5/34
U.S. Cl. 524—103 15 Claims

1. A compound of the formula I wherein

R^1 is selected from hydrogen and an alkyl group of 1–5 carbon atoms,

R^2 is selected from hydrogen, oxyl, hydroxyl, a straight or branched chain methylene linked alkyl group having from 1 to 18 carbon atoms, an alkanoyl group having 2–18 carbon atoms, an alkenoyl group having 3 to 6 carbon atoms, an alkynyl group having 3 to 6 carbon atoms, a cyanomethyl group, a 2,3-epoxypropyl group, a benzyl or an alkyl substituted benzyl group having 7–15 carbon atoms, a group—$CH_2CH(OR^5)$—R^6 and a group of the formula



wherein Z is a group selected from —OR^7 and —$N(R^8)(R^9)$ when m is 1 or 0 and when m is 0, Z can be a group —CO—OR^{10},

wherein

R^5 is selected from hydrogen, an aliphatic group of 1–18 carbon atoms, an araliphatic group, and an aliphatic acyl group having 2–18 carbon atoms described for said R^2,

R^6 is selected from hydrogen, an alkyl group of 1 to 16 carbon atoms and phenyl,

R^7 is selected from an alkyl group from 1 to 18 carbon atoms, a cycloalkyl group of 5–12 carbon atoms, and a group of formula II,

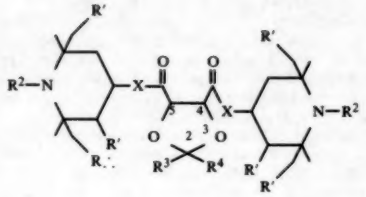
R^8 and R^9, same or different, are selected from hydrogen, an alkyl group having 1–18 carbon atoms, a cycloalkyl group having 5–12 carbon atoms, an aryl group having 6–10 carbon atoms and aralkyl groups having 7–15 carbon atoms, R^8 and R^9 together with the nitrogen atom to which they are attached can form a pyrrolidine, piperidine or homopiperidine ring,

R^{10} is selected from an aliphatic group of 1–18 carbon atoms, phenyl and benzyl,

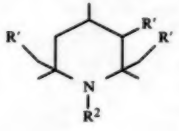
R^3 and R^4 may independently be selected from hydrogen or an alkyl group of 1–14 carbon atoms, an alkenyl group of 2–4 carbon atoms, a group $-(CH_2)_nCO-OR^{11}$ where n is 0 or 1, and a group of formula III, wherein

R^{11} is selected from an alkyl group having up to 18 carbon atoms or a group of formula II, when R^3 is hydrogen R^4 is a group of formula IV where A is a 1–4 carbon alkylene group, a phenylene group or a direct bond, when R^3 is methyl R^4 can be a group of formula V where p is 1 or 2, R^3 together with the carbon atoms to which they are attached can form a cycloalkyl group having 5–12 atoms or denote a group of the formula VI or the group of formula VII wherein the C atom labelled 2 is the same as that labelled 2 in formula I,

X is either —O or $-NR^{12}-$ where R^{12} is selected from hydrogen or an alkyl group of 1–8 carbon atoms, and wherein said formulas are:



(I)



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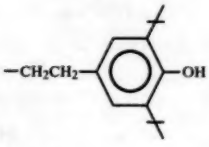

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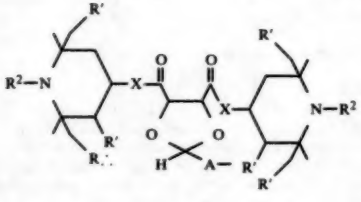

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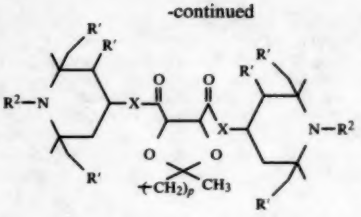
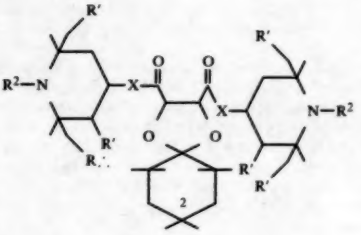
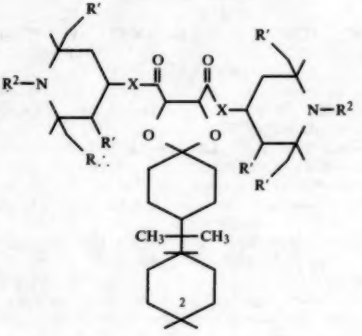


(V)



(VI)



(VII)

15. A method of stabilizing organic polymers against light induced deterioration which comprises incorporating therewith from 0.01–5% by weight of a compound of claim 1.

4,687,801

RESIN COMPOSITION

Tetsuo Mitani, Toyonaka; Fumiaki Baba, Kobe, and Katsuyoshi Iisaka, Kawanishi, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 17, 1985, Ser. No. 776,885

Claims priority, application Japan, Sep. 17, 1984, 59-196167; Jan. 9, 1985, 60-1898

Int. Cl.[4] **C08K** *3/10, 5/04, 5/20, 5/41*

U.S. Cl. 524—104 **6 Claims**

1. A resin composition which consists essentially of a thermoplastic resin in which are included effective amounts to impart an antistatic effect to said resin composition in an amount of at least 0.1 parts by weight in 100 parts by weight of said thermoplastic resin of an alkali metal salt which ionically disassociates in said resin, and at least 1 part by weight in 100 parts of said thermoplastic resin of at least one kind of substance selected from the group of vinylidene fluoride resin and dipolar aprotic solvent which dissolves the alkali metal salt and is compatible with the resin.

4,687,802

GLASS FIBER REINFORCED POLYESTER MOLDING COMPOSITIONS CONTAINING METAL SALTS

Leonard R. Hepp, Evansville, Ind., assignor to General Electric Company, Pittsfield, Mass.

Filed Feb. 25, 1985, Ser. No. 705,444
Int. Cl.[4] C08L 67/02; C08K 3/10, 3/22, 3/26
U.S. Cl. 524—411 9 Claims

5. A thermoplastic molding composition from which parts may be molded exhibiting improved Arc Track Rate comprising:

(a) poly(1,4-butylene terephthalate) resin;

(b) a flame retarding halogenated aromatic flame retardant;

(c) an effective amount of antimony compound synergist; and

(d) an amount of at least one effective metal salt selected from the group consisting of the oxides, fluorides, chlorides, bromides, iodides, chlorates, nitrates, nitrites, borates, phosphates, phosphites, sulfates and sulfites of magnesium, aluminum, iron and potassium sufficient to reduce Arc Track Rate, said amount being from about 0.05 to about 1 part by weight of said metal salt for each 50 parts by weight of said resin and halogenated aromatic flame retardant.

4,687,803

DIELECTRIC FILMS COMPRISING STRETCHED FILMS OF VINYLIDENE FLUORIDE AND PORCELAIN PARTICLES

Yoshikichi Teramoto; Ke ichi Nakamura, and Naohiro Murayama, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 733,128, May 10, 1985, abandoned, which is a continuation of Ser. No. 551,290, Nov. 14, 1983, abandoned, which is a continuation-in-part of Ser. No. 434,464, Oct. 14, 1982, abandoned. This application Jun. 26, 1986, Ser. No. 879,823
Claims priority, application Japan, Oct. 12, 1981, 56-168072
Int. Cl.[4] H01G 4/00; C08K 3/08
U.S. Cl. 524—413 6 Claims

1. A dielectric film comprising a stretched body of a composition consisting essentially of a vinylidene fluoride resin crosslinked to have a gel content of about 10 to about 75% and dispersed in the vinylidene fluoride resin, finely divided dielectric porcelain particles having the average particle size of 0.01 μm to 10 μm in an amount of from about 5 to about 60% by volume based on the total volume of the composition, the dielectric constant of said stretched film being at least as great as that of the unstretched film.

4,687,804

EXTERIOR BODY PART FOR AUTOMOTIVE VEHICLE

Masao Shiraishi; Yoshinori Nishiya, and Syoji Ito, all of Mie, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 749,978, Jan 28, 1985, abandoned.
This application Nov. 10, 1986, Ser. No. 928,582
Claims priority, application Japan, Jun. 30, 1984, 59-134106
Int. Cl.[4] C08L 53/00
U.S. Cl. 524—505 17 Claims

1. An exterior body part for an automotive vehicle comprising a thermoplastic resin composition, said composition comprising:

100 parts by weight of the hydrogenated product of a block copolymer represented by the formula:

$$A(B—A)_n$$

wherein A is a polymer block of a monovinyl-substituted aromatic hydrocarbon, B is an elastomeric polymer block of a conjugated diene, and n is an integer of 1 to 5;

60 to 200 parts by weight of a propylene/α-olefin block copolymer resin having an MFR value of from 10 to 100 g/10 minutes;

0 to 50 parts by weight of a softening agent for nonaromatic rubber; and

0 to 200 parts by weight of an ethylene/α-olefin copolymer rubber.

4,687,805

HALOGENATED ETHYLENE-CARBON MONOXIDE INTERPOLYMERS

Mary L. N. White, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 740,667, Jun. 3, 1985, Pat. No. 4,616,072.
This application Apr. 30, 1986, Ser. No. 857,924
The portion of the term of this patent subsequent to Oct. 7, 2003, has been disclaimed.
Int. Cl.[4] C08G 69/02; C08F 8/22
U.S. Cl. 524—569 36 Claims

1. A halogenated ethylene-carbon monoxide interpolymer, consisting essentially of:

a backbone of interpolymerized ethylene and carbon monoxide; and

halogen substituted substantially only at carbon atoms adjacent carbonyl groups in said backbone.

4,687,806

METHOD OF REDUCING VISCOSITY OF RADIATION CURABLE ACRYLATE FUNCTIONAL RESIN

William J. Morris, deceased, late of Louisville (by Carla L. Morris, legal representative); Richard R. Kemmerer, Louisville, and Byron K. Christmas, Jeffersontown, all of Ky., assignors to Interez, Inc., Louisville, Ky.

Filed Nov. 15, 1985, Ser. No. 798,451
Int. Cl.[4] C08K 3/16, 5/05; C08L 63/10
U.S. Cl. 524—765 23 Claims

1. A radiation curable composition comprising an oligomeric polyacrylate having secondary hydroxyls in its molecular configuration in admixture with lithium bromide wherein the lithium bromide is present at about 0.05 to about 0.5 percent by weight based on the total weight of the curable composition.

2. The composition of claim 1 wherein the oligomeric polyacrylate is a polyacrylic acid ester of a diglycidyl ether of a dihydric phenol, a polyglycidyl ether of an aliphatic polyol or a diglycidyl ester of a dicarboxylic acid.

5. The composition of claim 1 wherein the lithium bromide is added as a solution comprising about 90 to about 92.5 percent by weight polar solvent and about 10 to about 7.5 percent by weight lithium bromide.

6. The composition of claim 5 wherein the solvent is water, methanol, ethanol, isopropanol, acrylic acid or methacrylic acid.

8. The composition of claim 6 wherein the solvent is methanol which is present in the amount of about 1.5 to about 1.95 percent by weight based on the total weight of the composition.

4,687,807

USE OF AMIDASE FOR REDUCING THE ACRYLAMIDE CONTENT OF WATER-IN-OIL EMULSIONS CONTAINING ACRYLAMIDE POLYMERS

Robert L. Wetegrove, Winfield, and Ralph W. Kaesler, Barrington, both of Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Feb. 13, 1987, Ser. No. 14,327
Int. Cl.[4] C08J 9/04
U.S. Cl. 524—827 3 Claims

1. An improved method for reducing the acrylamide present in water-in-oil emulsions of acrylamide polymers with Amidase which comprises adding the Amidase to the water-in-oil emulsion of the acrylamide polymer upon completion of its polymerization and then subjecting the thus treated water-in-oil emulsion to one or more of the following steps:

(a) pH adjustment,
(b) heating,
(c) inert gas sparging, and,
(d) adding a chemical reducing agent.

4,687,808

ACTIVATION OF BIOCOMPATIBLE POLYMERS WITH BIOLOGICALS WHOSE BINDING COMPLEMENTS ARE PATHOLOGICAL EFFECTORS

Robert D. Jarrett, and G. Howard McCain, both of Painesville, Ohio, assignors to BioSpecific Technologies, Inc., Painesville, Ohio

Continuation-in-part of Ser. No. 407,613, Aug. 12, 1982, abandoned, and Ser. No. 407,614, Aug. 12, 1982, abandoned.
This application Jul. 20, 1983, Ser. No. 515,949
Int. Cl.[4] C07D *251/02*
U.S. Cl. 525—54.1 14 Claims

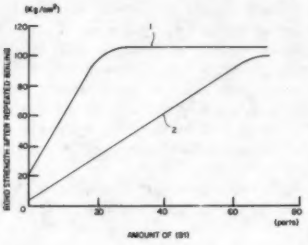
1. A biospecific polymer comprising:
(a) a biocompatible terpolymer support comprising glycidyl methacrylate, N-vinylpyrrolidone and hydroxyethyl methacrylate; and
(b) a biological or biologicals immobilized on said terpolymer support via chemical bonding and wherein said biological or biologicals retain their reactivity for adsorbing specific pathological effectors or specific groups of pathological effectors.

4,687,809

ROOM TEMPERATURE SETTING ADHESIVE COMPOSITION

Takeshi Kamikaseda, Suita, and Makoto Yamamoto, Shiga, both of Japan, assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Jun. 24, 1986, Ser. No. 877,830
Claims priority, application Japan, Jun. 25, 1985, 60-139973
Int. Cl.[4] C08L *29/04*
U.S. Cl. 525—57 3 Claims



1. A room temperature setting adhesive composition containing, as main components thereof, (A) a polyvinyl acetate emulsion containing an acetoacetylated polyvinyl alcohol and (B) a resorcinol resin precondensate and, as a curing agent, (C) hexamethylenetetramine, characterized in that said polyvinyl acetate emulsion is an emulsion of a vinyl acetate copolymer produced by copolymerizing an acetoacetylated, ethylenically unsaturated monomer and another ethylenically unsaturated monomer.

4,687,810

MAKING RUBBER BLENDS OF DIENE RUBBER & EPR OR EPDM

Aubert Y. Coran, Akron, Ohio, assignor to Monsanto Company, St. Louis, Mo.

Filed Jan. 2, 1986, Ser. No. 815,495
Int. Cl.[4] C08L *13/00, 9/00, 23/26, 51/04*
U.S. Cl. 525—74 6 Claims

1. The process of producing a rubber blend by masticating a mixture of (A) monoolefin copolymer rubber which is a largely non-crystalline, rubbery copolymer of two or more alpha monoolefins and, optionally, a lesser quantity of a non-conjugated diene, which rubber has been modified to engraft functional groups thereto which provide selective vulcanization cites, (B) high-diene hydrocarbon rubber which is selected from homopolymers of diolefin monomers or copolymers containing a major portion of diolefin monomers and a vulcanizing agent capable of vulcanizing (A) but not (B), said masticating being performed at vulcanizing temperature for (A) until (A) is vulcanized but (B) is not, the ratio of (A) to (B) in the mixture not being so high as to produce an unprocessable blend.

4,687,811

POLYMERIZATION PROCESS FOR POLYESTER

Isao Sasaki, and Hiroshi Mori, both of Otake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Jul. 17, 1986, Ser. No. 886,495
Claims priority, application Japan, Aug. 14, 1985, 60-179212
Int. Cl.[4] C08F *8/00*; C08L *83/00*
U.S. Cl. 525—100 14 Claims

1. A process for producing a polyester, which comprises thermal polymerization of a bis(ω-hydroxyalkyl)terephthalate or an oligomer thereof in the form of fine particles dispersed in a silicone oil by using a graft polymer, as a dispersion stabilizer, contructed of both a polysiloxane and an acrylic polymer.

4,687,812

CROSSLINKABLE COMPOSITION COMPRISING MODIFIED AMINOEPOXY RESINS - II

Ray A. Dickie, Birmingham, and Saiyed B. A. Oaderi, Livonia, both of Mich., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 679,962, Dec. 10, 1984, Pat. No. 4,617,348.
This application Jul. 28, 1986, Ser. No. 889,992
Int. Cl.[4] C08F *8/32*; C08L *63/10*
U.S. Cl. 525—111 39 Claims

1. A crosslinkable composition of matter comprising first and second resins,

said first resin being substantially gel-free diene functional aminoepoxy resin of number average molecular weight (Mn) about 1000–18,000, comprising the reaction product of diepoxide reactant with first reactant comprising amine functional conjugated diene chain extending reactant selected from the group consisting of di-secondary amine functional bis-diene, mono-primary amine functional diene, and a mixture of any of them,

said second resin being substantially gel-free blocked dieneophile functional aminoepoxy resin, other than said diene functional aminoepoxy resin, having number average molecular weight (Mn) about 1000–18,000, comprising the reaction product of diepoxide reactant with second reactant comprising amine functional blocked dieneophile chain extending reactant selected from the group consisting of di-secondary amine functional bis-blocked dieneophile, mono-primary amine functional blocked dieneophile, and a mixture of any of them,

at least one of said first reactant and said second reactant further comprising modifying agent comprising hydroxy functional secondary amine, and at least one of said first reactant and said secondary reactant further comprising second modifying agent selected from the group consisting of secondary amine terminated butadiene acrylonitrile copolymer resin, carboxy terminated butadiene acrylonitrile copolymer resin, and any mixture thereof, said second modifying agent having number average molecular weight about 1400–4400 and amine or carboxy, respectively, equivalent weight of about 700–2200,

said composition further comprising crosslinking agent reactive with hydroxy functionality.

4,687,813
PRODUCTION OF COATINGS

Werner Lenz, Bad Duerkheim; Hans Sander, Ludwigshafen, and Dieter Moeller, Ascheberg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 624,292, Jun. 25, 1984, abandoned. This application Jan. 6, 1986, Ser. No. 817,757

Claims priority, application Fed. Rep. of Germany, Jun. 24, 1983, 3322829

Int. Cl.[4] C08F *8/30*

U.S. Cl. 525—131 **20 Claims**

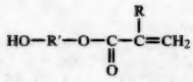
1. A process for the production of a coating based on a reaction product of

(A) a polyhydroxypolyacrylate resin obtained from an ester of acrylic acid or methacrylic acid with a monofunctional aliphatic alcohol, or a mixture of esters of acrylic acid and methacrylic acid with monofunctional aliphatic alcohols, a monoester of acrylic acid with methacrylic acid with a polyfunctional aliphatic alcohol, or a mixture of monoesters of acrylic acid and methacrylic acid with polyfunctional aliphatic alcohols, and other copolymerizable oefinically unsatured monomers, with

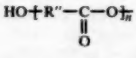
(B) a polyisocyanate which is unblocked or partially or completely blocked with CH—, NH— or OH-acidic blocking agents, contains isocyanurate groups and may or may not contain biuret groups and has a functionality of from 2.5 to 6,

wherein the polyhydroxypolyacrylate resin (A) used comprises hydroxyl-containing copolymers consisting of

(a) from 6 to 70% by weight of one or more esters of the formula

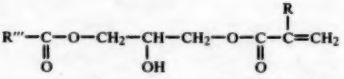


where R is hydrogen or methyl and R′ is a straight-chain or branched alkylene radieal of 2 to 18 carbon atoms or alkylene of 7 to 17 carbon atoms which contains one, two or three cycloaliphatic groups, and some or all of the HO—R′—groups can be replaced by Z—O—R′—groups, where Z is a radical of the general formula



where n is an integer from 1 to 3 and R″ is an alkylene chain of 4 to 8 carbon atoms which may additionally contain 1 to 3 alkyl substituents with a total of not more than 10 carbon atoms and/or a cycloaliphatic radical of 6 to 10 carbon atoms and/or an unsubstituted or alkyl-substituted aromatic radical of 6 to 8 carbon atoms and/or an araliphatic radical of 7 to 9 carbon atoms and/or an alkoxy radical of 1 to 8 carbon atoms,

(b) from 0 to 50% by weight of one or more hydroxylalkyl esters of acrylic acid or methacrylic acid of the formula



where R is hydrogen or methyl and R‴ is the alkyl radical of a branched aliphatic carboxylic acid of 4 to 26 carbon atoms,

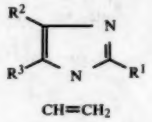
(c) from 10 to 50% by weight of one or more alkyl esters of acrylic acid or methacrylic acid, which form homopolymers having a glass transition temperature of from +5° to +120° C.,

(d) from 0 to 10% by weight of a vinylaromatic,

(e) from 10 to 60% by weight of one or more alkyl esters or alkylglycol esters of acrylic acid of methacrylic acid, which form homopolymers which have a glass transistion temperature of from −80 to +4.5° C., the alkylglycol esters containing not more than 2 ether oxygen bridges,

(f) from 0 to 10% by weight of an acrylamide or a methacrylamide which may or may not be substituted at the amide nitrogen by one or two alkyl radicals of 1 to 8 carbon atoms which may or may not contain a carbonyl group, or by one or two phenyl radicals,

(g) from 1 to 25% by weight of one or more N-vinylimidazoles of the formula



where R^1, R^2, and R^3 are each hydrogen, methyl, ethyl, a straight-chain or branched alkyl radical of 3 or 4 carbon atoms, or phenyl,

(h) from 0 to 20% by weight of monomers which are not stated under (a) to (g) and whose copolymerized radicals ar inert to isocyanate groups, with the proviso that the sum of the percentages stated under (a) and (b) is from 6 to 70, the sum of the percentages stated under (c), (d) and (g) is from 11 to 60, and the sum of the percentages of the components stated under (a) to (h) is 100, and the polyisocyanate (B) used, which contains isocyanurate groups, may or may not contain biuret groups and has a functionality of from 2.5 to 6, comprises a mixture of (B1) from 60 to 99% by weight of an isocyanurate-containing polyisocyanate which possesses predominantly cycloaliphatically bonded isocyanate groups, and (B2) from 1 to 40% by weight of a polyisocyanate which contains biuret or isocyanurate groups or both biuret and isocyanurate groups and possesses predominantly aliphatically bonded isocyanate groups, the sum of the percentages stated under (B1) and (B2) being 100, and/or an isocyanurate-containing polyisocyanate which contains, as copolymerized units,

(1) from 60 to 99% by weight of a diisocyanate possessing one or more cycloaliphatically bonded isocyanate groups, and

(2) from 1 to 40% by weight of an aliphatic diisocyanate, the sum of the percentages stated under (1) and (2) being 100.

4,687,814
PARTIALLY HYDROPHILIC, NON-IONIC CROSSLINKED COPOLYMERS AND THEIR APPLICATION TO SIZE EXCLUSION CHROMATOGRAPHY IN AQUEOUS MEDIA

Philippe Chaumont, La Wantzennau; Gérard Beinert, Strasbourg; Jean Herz, Barr, and Paul Rempp, Strasbourg, all of France, assignors to Centre National de la Recherche Scientifique, Paris, France

Filed Jan. 22, 1985, Ser. No. 692,974

Claims priority, application France, Jan. 25, 1984, 84 01146

Int. Cl.[4] C08F *257/02, 297/02, 8/00;* **C08G** *65/02*

U.S. Cl. 525—242 **4 Claims**

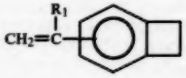
1. A partially hydrophilic, non-ionic crosslinked copolymer having a three-dimensional network, which consists essentially of a crosslinked hydrophobic backbone of polystyrene having a high mechanical strength and of non-ionic hydrophilic chains of polyoxirane grafted selectively onto said backbone, the grafting of the hydrophilic non-ionic chains onto the hydrophobic backbone of the copolymer being achieved by carbanionic initiation with divinylbenzene.

4,687,815
HYDROGENATED BLOCK COPOLYMERS

Pui K. Wong, Katy, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Dec. 23, 1985, Ser. No. 812,424
Int. Cl.[4] C08F *297/02, 297/04*
U.S. Cl. 525—271 18 Claims

1. A block copolymer selected from the group consisting of AB block copolymers, ABA block copolymers, $(AB)_mY$ block copolymers, $(AB)_nY—A)_o$ block copolymers, $(AB)_nY—B)_p$ block copolymers and mixtures thereof where each "A" is a copolymer block of a monoalkenyl arene monomer and a benzocyclobutene monomer of the formula



where R is H or CH_3, each "B" is a substantially completely hydrogenated conjugated diene polymer block, "m", "n", "o" and "p" are each 1 to about 30 and Y is the residue of a multifunctional coupling agent.

4,687,816
SURFACE TREATMENT OF SOFT CONTACT LENSES

Shaow B. Lin, Phoenix; Lyle M. Bowman, Scottsdale; S. Kumar Chandrasekaran, Paradise Valley, and Thomas B. Harvey, III, Scottsdale, all of Ariz., assignors to Sola U.S.A. Inc., Phoenix, Ariz.

Filed Aug. 14, 1985, Ser. No. 765,886
Int. Cl.[4] C08F *8/32*
U.S. Cl. 525—279 16 Claims

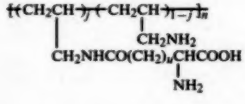
1. A process for increasing the resistance of a soft contact lens to the deposition thereon, and diffusion and accumulation therein, of substances which will promote its clouding and discoloration in use, said process comprising contacting, in an anhydrous medium, the xerogel form of a hydroxyl group-containing acrylic ester soft contact lens with an organic acid anhydride in which the organic (non-carboxyl) moiety is selected from the group consisting of C1–C8 alkyl (including cycloalkyl), halogen-substituted C1–C8 alkyl, or silyloxy-substituted C1–C8 alkyl, said anhydride being present in about 10 to 30% by volume with respect to said medium.

4,687,817
NOVEL FUNCTIONALIZED RESIN DERIVED FROM POLYALLYLAMINE

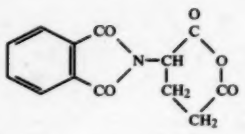
Susumu Harada; Kiyoshi Shimizu, and Masayuki Ujiie, all of Koriyama, Japan, assignors to Nitto Boseki Co. Ltd., Fukushima, Japan

Division of Ser. No. 670,545, Nov. 13, 1984, Pat. No. 4,604,451.
This application May 14, 1986, Ser. No. 863,107
Claims priority, application Japan, Nov. 15, 1983, 58-214777
Int. Cl.[4] C08F *8/30*
U.S. Cl. 525—375 3 Claims

1. A process for producing a functionalized resin represented by the general formula:

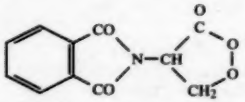


wherein $n \geqq 10$, $0<j<1$ and $u=1$ or 2, comprising reacting polyallylamine with N,N-phthaloylglutamic 1,5-anhydride represented by the formula



(III)

or N,N-phthaloylaspartic 1,4-anhydride represented by the formula



(IV)

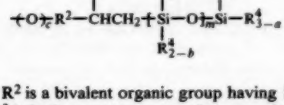
and treating the resulting polymer with hydrous hydrazine.

4,687,818
POLYMER AND PRESSURE SENSITIVE ADHESIVE COMPOSITION

Fumio Kawakubo; Miyako Takanoo, both of Kobe; Sadao Yukimoto, Akashi, and Katsuhiko Isayama, Kobe, all of Japan, assignors to Kanegafuchi Kogaku Kabushiki Kaisha, Osaka, Japan

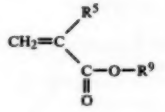
Continuation of Ser. No. 545,645, Oct. 26, 1983, abandoned.
This application Jul. 29, 1985, Ser. No. 759,877
Claims priority, application Japan, Oct. 27, 1982, 57-189432
Int. Cl.[4] C08L *71/02*
U.S. Cl. 525—404 9 Claims

1. A curable polymer obtained by addition-polymerizing a vinyl monomer in the presence of a polyether having at least one reactive silicon functional group in the molecule on the average, and having a main chain that consists essentially of recurring units of the general formula: $—R^1O—$ wherein R^1 is a bivalent hydrocarbon group having 1 to 8 carbon atoms with the reactive silicon functional group being a group of the general formula (1):



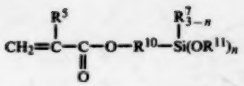
(1)

wherein R^2 is a bivalent organic group having 1 to 20 carbon atoms, R^3 is hydrogen or a monovalent organic group having 1 to 20 carbon atoms, R^4 is a monovalent hydrocarbon group or a triorganosiloxy group, a is 0, 1, 2 or 3, b is 0, 1 or 2, c is 0 or 1, provided $1 \leqq a+b \leqq 4$, X is a silanol group or a hydrolyzable group, and m is 0 or an integer of 1 to 18, and the vinyl monomer comprises at least one member selected from the group consisting of a vinyl monomer of the general formula (6):



(6)

wherein R^5 is hydrogen atom, a halogen atom or a monovalent aliphatic hydrocarbon group having 1 to 10 carbon atoms, and R^9 is a monovalent hydrocarbon group having 1 to 20 carbon atoms, and a vinyl monomer of the general formula (7):



(7)

wherein R^5 is as defined above, R^7 is a monovalent hydrocarbon group having 1 to 10 carbon atoms selected from the group consisting of an alkyl group, an aryl group and aralkyl group, R^{10} is a bivalent hydrocarbon group having 1 to 10 carbon atoms, R^{11} is a monovalent hydrocarbon group having 1 to 8 carbon atoms, and n is an integer of 1 to 3.

4,687,819

POLYTEREPHTHALATECARBONATE-POLYETHERIMIDE-POLYESTER BLENDS

Clayton B. Quinn, Mt. Vernon, Ind., and Fred F. Holub, Schenectady, N.Y., assignors to General Electric Company, Pittsfield, Mass.

Filed Dec. 31, 1984, Ser. No. 687,976

Int. Cl.[4] C08F *283/04;* **C08L** *77/00*

U.S. Cl. 525—425 **14 Claims**

1. A thermoplastic composition comprising in admixture (a) from about 5 to about 80 weight percent of a polyetherimide, (b) from about 15 to about 75 weight percent of a polyester selected from the group consisting of polybutylene terephthalate, polyethylene terephthalate, a polybutylene terephthalate copolyester, a polyethylene terephthalate copolyester or mixtures thereof, wherein said polybutylene terephthalate copolyester and polyethylene terephthalate copolyester contain from about 0.5 to about 2% by weight of repeating units derived from an aliphatic dicarboxylic acid having up to 50 carbon atoms, an aromatic dicarboxylic acid having up to 36 carbon atoms or an aliphatic glycol or polyol having up to 50 carbon atoms and (c) from about 5 to about 80 weight percent of a polyterephthalatecarbonate prepared from a dihydric phenol, a carbonate precursor, terephthalic acid or an ester-forming derivative thereof, an isophthalic acid or an ester-forming derivative thereof, said polyterephthalatecarbonate having from about 60 to 95 weight percent ester content, said ester containing from about 80 to about 98 weight percent terephthalate groups and from about 2 to about 20 weight percent isophthalate groups.

4,687,820

MODIFIED POLYPEPTIDE SUPPORTS

Kenneth C. Hou, S. Glastonbury, and Tung-Ping D. Liao, Vernon, both of Conn., assignors to Cuno Incorporated, Meriden, Conn.

Continuation of Ser. No. 643,212, Aug. 22, 1984, abandoned, which is a continuation-in-part of Ser. No. 576,448, Feb. 2, 1984, which is a continuation-in-part of Ser. No. 466,114, Feb. 14, 1983, abandoned. This application Apr. 22, 1986, Ser. No. 857,513

Int. Cl.[4] D06M *3/02, 13/20;* **C08L** *89/00*

U.S. Cl. 525—54.1 **5 Claims**

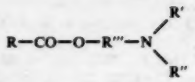
1. A process for effecting chromatographic separation of at least two components of a sample comprising contacting said sample with a self-supporting fibrous matrix comprising a modified polypeptide material, said modified polypeptide material comprising:

(1) a water insoluble polypeptide covalently bonded to a synthetic polymer;

(2) said synthetic polymer comprising a copolymer made from a free-radical polymerization of

(a) a polymerizable compound containing an epoxy group capable of direct covalent coupling to an amino group of said polypeptide and a vinyl group, capable of free-radical polymerization; and

(b) a polymerizable compound having the formula



wherein R is an alpha, beta-ethylenically unsaturated polymerizable radical, R′ and R″ are the same or different C_1–C_6 alkyl or alkanoyl groups, and R‴ is a direct bond or a C_2–C_3 alkyl group, wherein R′ and R″, taken together with the N atom may form a heterocyclic ring.

4,687,821

PREPARATION, DECARBOXYLATION AND POLYMERIZATION OF NOVEL ACID FLUORIDES AND RESULTING MONOMERS

Bobby R. Ezzell, Lake Jackson; William P. Carl, Angleton, and William A. Mod, Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 158,426, Jun. 11, 1980, Pat. No. 4,515,989. This application Jul. 5, 1983, Ser. No. 510,517

Int. Cl.[4] C08F *14/18*

U.S. Cl. 526—247 **9 Claims**

1. A method of homopolymerizing one or more of the compounds represented by the general formula

$$Y(CF_2)_a(CFR_f)_bCFR'_f—O—CF=CF_2$$

comprising reacting said compound in the presence of an initiator for a sufficient time and at a sufficient temperature to cause polymerization; where

a=0 to 3;

b=0 to 3;

R'_f and R_f are independently selected from the group consisting of F, Cl, perfluoroalkyl radicals or fluorochloroalkyl radicals; and

Y=Br.

4,687,822

ACRYLIC RESIN COMPOSITION FOR USE IN HIGH SOLIDS PAINTS

Yoshio Eguchi, Osaka, and Atsushi Yamada, Kyoto, both of Japan, assignors to Nippon Paint Company, Ltd., Osaka, Japan

Filed Dec. 26, 1985, Ser. No. 813,551

Claims priority, application Japan, Dec. 26, 1984, 59-276707

Int. Cl.[4] C08F *8/08*

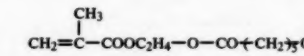
U.S. Cl. 526—265 **2 Claims**

1. An acrylic resin composition for use in high solids paints, which consists essentially of an acrylic copolymer having a number average molecular weight of 500 to 5000, prepared by subjecting the following mixture to polymerization:

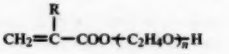
(A) 30 to 88 weight % of an alkyl (meth)acrylate,

(B) 2 to 60 weight % of 2,4-diphenyl-4-methyl-1-pentene,

(C) 10 to 40 weight % of a hydroxy bearing ethylenically unsaturated monomer selected from the group consisting of hydroxyethyl acrylate, hydroxyethyl methacrylate, hydroxypropyl acrylate, hydroxypropyl methacrylate, diethylene glycol acrylate, diethylene glycol methacrylate, hydroxybutyl methacrylate, and a member represented by either one of the following formulae:

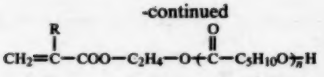


I.



II.

-continued



III.

wherein n in formula II is 2 or more and n in formula III is 1 to 5, and wherein said R group represents hydrogen or a methyl group,

(D) 0 to 10 weight % of an ethylenic unsaturated acid selected from the group consisting of acrylic acid and methacrylic acid, and

(E) 0 to 30 weight % of another copolymerizable monomer selected from the group consisting of t-butyl styrene, α-methyl styrene, vinyl toluene, dimethyl aminoethyl acrylate, dimethyl aminoethyl methacrylate, diethyl aminoethyl acrylate, diethyl aminoethyl methacrylate, vinyl pyridine, acrylamide, N-methylol acrylamide, N-butoxyl methyl acrylamide, acrylonitrile; fumaric ester, itaconic ester, maleic ester,

said polymerization being carried out in the presence of one or more radical initiators.

4,687,823

ALKYNYL-BRIDGED POLY(ARYLCYCLOBUTENE) RESINS

Robert A. Kirchhoff, and Stephen F. Hahn, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 1, 1986, Ser. No. 880,778
Int. Cl.⁴ C08F *267/04*
U.S. Cl. 526—284 **16 Claims**

1. An arylcyclobutene monomer having two arylcyclobutene moieties bridged by an alkynyl molecular group.

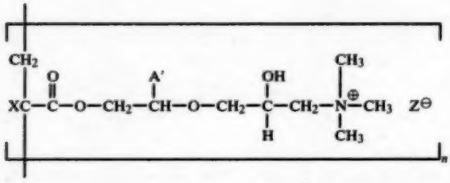
4,687,824

QUATERNARY AMMONIUM POLYMERS

Walter L. Vaughn, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 528,755, Sep. 1, 1983, Pat. No. 4,596,888. This application Apr. 11, 1986, Ser. No. 850,787
Int. Cl.⁴ C08F *22/38*
U.S. Cl. 526—292.2 **3 Claims**

1. A homopolymer having difunctional mers of the formula:



wherein

X is selected from the group consisting of a hydrogen ion and a methyl group;

A′ is selected from the group consisting of a hydrogen ion and a methyl group;

$Z^{\ominus}$ is an anion selected from the group consisting of chloride, bromide, iodide, hydroxide, and nitrate; and

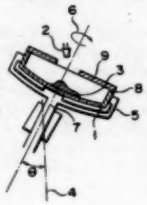
n represents the number of mers forming the homopolymer.

4,687,825

METHOD OF MANUFACTURING PHOSPHOR SCREEN OF CATHODE RAY TUBE

Seiji Sagou, and Takeo Itou, both of Fukaya, Japan, assignors to Kabushiki Kaisha Toshiba, Kabushiki, Japan

Filed Sep. 16, 1985, Ser. No. 776,605
Claims priority, application Japan, Mar. 30, 1984, 59-60815
Int. Cl.⁴ B05D *3/06, 5/12*
U.S. Cl. 427—54.1 **14 Claims**



1. A method of manufacturing a phosphor screen of a cathode ray tube, comprising:

forming a pattern having a particle-receptive adhesive surface on an inner surface of a face plate having a peripheral wall;

rotating said face plate at a rotational frequency of 1 to 100 rpm about an axis perpendicular to an inner surface thereof and passing a center thereof, the axis of the face plate being inclined with respect to a vertical axis; and

charging phosphor particles onto the inner surface of said face plate during or before rotation thereof so as to allow the phosphor particles to slide on the inner surface of said face plate and to attach to said particle-receptive adhesive surface.

4,687,826

MODIFIED PROTEIN ADHESIVE BINDER AND PROCESS FOR PRODUCING

Alan L. Steinmetz, Keego Harbor, Mich., and Thomas L. Krinski, Granite City, Ill., assignors to Ralston Purina Company, St. Louis, Mo.

Filed Oct. 31, 1986, Ser. No. 926,709
Int. Cl.⁴ C08J *7/16;* C08L *89/00;* C09J *3/18*
U.S. Cl. 527—201 **44 Claims**

1. A process for the production of a modified vegetable protein adhesive binder comprising:

(a) forming an alkaline dispersion of a vegetable protein material;

(b) treating said dispersion with a hydroxy alkyl acrylate in an amount sufficient to modify the protein material.

4,687,827

BRUSHING CYANOACRYLATES: PACKAGING AND METHOD

Libby J. Russo, 3122 Bandera Dr., Palo Alto, Calif. 94304

Filed Jun. 26, 1986, Ser. No. 879,820
Int. Cl.⁴ B05D *1/28*
U.S. Cl. 427—340 **7 Claims**

1. A method of applying cyanoacrylate to a selected surface, said method comprising the steps of:

pre-wetting the bristles of a brush with a solvent for cyanoacrylate;

immersing the bristles of the pre-wetted brush with a cyanoacrylate monomer formulation; and

brushing the cyanoacrylate formulation onto a selected surface.

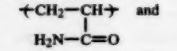
4,687,828

WATER SOLUBLE GRAFT COPOLYMERS OF LIGNIN-(2-PROPENAMIDE)-(SODIUM 2,2-DIMETHYL-3-IMINO-4-OXOHEX-5-ENE-1-SULFONATE), METHODS OF MAKING THE SAME AND USES THEREFOR

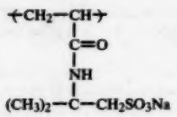
John J. Meister, Dallas, Tex., and Damodar R. Patil, Gainsville, Fla., assignors to Southern Methodist University, Dallas, Tex.

Filed Aug. 30, 1985, Ser. No. 771,270
Int. Cl.[4] C08L 97/00; C08H 5/02
U.S. Cl. 527—400 6 Claims

1. A water-soluble graft copolymer of lignin-(2-propenamide)-(sodium 2,2-dimethyl-3-imino-4-oxohex-5-ene-1-sulfonate) having a central lignin network and at least one grafted side chain, R, having randomly repeating units of 2-propenamide, having the formula (I), in the amount of from about 1-99 molar %, and of sodium 2,2-dimethyl-3-imino-4-oxohex-5-ene-1-sulfonate having the formula (II), in the amount of from about 99-1 molar %:



(I)



(II)

such that the central lignin network has a molecular weight of about 1,000 to 100,000 and the total number of randomly repeating units in the grafted side chain or chains is in the range of 1,000 to 300,000 units, such that the total graft copolymer molecular weight is in the range of 40,000 to 30,000,000.

4,687,829

METHOD OF ADJUSTING PHYSICAL PROPERTIES IN SILICONE ELASTOMERIC SEALANT

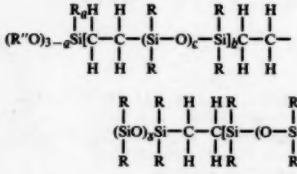
Roger G. Chaffee, and Leo F. Stebleton, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Mar. 3, 1986, Ser. No. 835,579
Int. Cl.[4] C08G 77/06
U.S. Cl. 528—17 16 Claims

1. A method of adjusting the physical properties of a silicone elastomeric sealant, having alkoxy functional groups, which is stable in the absence of moisture and cures upon exposure to moisture comprising

(A) mixing in the absence of moisture

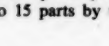
(1) 100 parts by weight of an alkoxy functional polydiorganosiloxane of the formula



where R is methyl, ethyl, propyl, phenyl, or trifluoropropyl, R'' is methyl or ethyl, a is 0 or 1, b is 0 or 1, c is from 1 to 6 and x is such that the viscosity is from 1 to 1000 Pa.s at 25° C.,

(2) From 0 to 500 parts by weight of a filler,

(3) from 2 to 15 parts by weight of a crosslinker of the formula



where R' is methyl or phenyl, R'' is methyl or ethyl, and a is 0 or 1,

(4) from 1 to 15 parts by weight of a chain extender selected from the formula $PhMeSi(OR'')_2$, $R''OSiMe_2OR''$, and $Ph(OSiMe_3)Si(OR'')_2$, where Ph is phenyl, Me is methyl, and R'' is methyl or ethyl, and the mols of chain extender (4) are less than the mols of crosslinker (3), and

(5) from 0.2 to 4.0 parts by weight of a titanium catalyst, and

(B) storing the mixture in the absence of moisture.

4,687,830

PROCESS FOR THE PRODUCTION OF LIGHT-STABLE, SOLVENT-RESISTANT POLYURETHANE-UREA ELASTOMER COATINGS BY REACTIVE COATING

Karl-Arnold Weber, Leverkusen; Hans-Josef Buysch, Krefeld; Karl-Ludwig Noble, Cologne, and Harro Träubel, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jun. 13, 1986, Ser. No. 874,308
Claims priority, application Fed. Rep. of Germany, Jun. 27, 1985, 3522978
Int. Cl.[4] C08G 18/10
U.S. Cl. 528—64 7 Claims

1. A process for the production of a light stable, solvent-resistant polyurethane urea elastomer coating on a substrate by the direct or reverse coating process which comprises

(I) continuously and separately introducing into a mixer the following components

(A) an NCO prepolymer having an NCO content of about 0.5 to 6% by weight, an overall functionality f' of about 1.95 to 2.8 and a monomeric diisocyanate content of less than about 2% by weight, said NCO prepolymer being either in liquid form or dissolved in an inert solvent having a boiling point of up to about 150° C. to form a solution having a solids content of at least about 70% by weight, said NCO prepolymer comprising the reaction product of

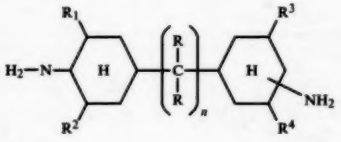
(a) a polyhydroxyl compound having a molecular weight of 400 to about 10,000 and an average functionality of about 1.90 to 2.8 with

(b) an isocyanate component comprising

(1) about 85 to 100 % by weight of an aliphatic or cycloaliphatic diisocyanate and

(2) 0 to about 15% by weight of a polyfunctional polyisocyanate containing at most one aromatic NCO group and at least two aliphatic or cycloaliphatic NCO groups, and

(B) a diamine present in a solvent free from aldehyde- or ketone-carbonyl groups, said diamine solution comprising a 2,4'- and/or 4,4'-diamino-3,3',5,5'-tetraalkyldicyclohexylalkane which corresponds to the formula



wherein

R^1 to R^4 may be the same or different and represent straight-chain or branched C_1–C_4 alkyl groups, and

R represents H, CH_3, C_2H_5, C_3H_7 or C_4H_9 provided that the group R—C—R contain no more than 4 carbon atoms and n is 1, 2 or 3,

(II) mixing said components and

(III) continuously discharging the reactive mixture onto the desired substrate in accordance with the direct process or, in accordance with the reverse coating process, onto an intermediate support and placing the substrate in contact with the reactive mixture while it is still reacting.

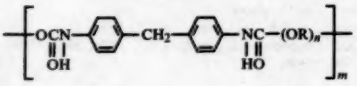
4,687,831

ANTITHROMBOGENIC SYNTHETIC ELASTOMER AND PROCESS OF PREPARATION THEREOF

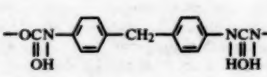
Naoya Ogata; Kohei Sanui; Nobuhiko Yui, all of Tokyo; Kazuhiko Nojima, Kanagawa; Kazunori Kataoka, Tokyo; Teruo Okano, Chiba, and Yasuhisa Sakurai, Tokyo, all of Japan, assignors to Research Development Corp. of Japan, Tokyo, Japan

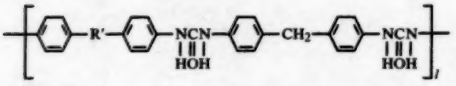
Filed Apr. 16, 1986, Ser. No. 852,656
Claims priority, application Japan, Apr. 26, 1985, 60-88857
Int. Cl.[4] C08G *18/10*
U.S. Cl. 528—64 12 Claims

1. An antithrombogenic synthetic elastomer having repeat structural units represented by the following structural formula comprising portions I and II:



I





II

wherein R is a straight-chain or branched-chain alkylene group containing from 2 to 4 carbon atoms, R′ is an amide group, a urethane group, or a urea group, n ranges up to 180, m is an integer of 1 to 20, and l is an integer of 1 to 10, said polymer having a microdomain structure comprised of the segments I and II, the domains of which have an average size of 10 to 20 nm, and the molecular weight of said polymer being in the range of about 80,000 to about 500,000.

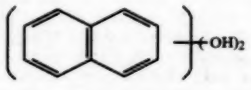
4,687,832

NOVEL EPOXY RESIN COMPOSITIONS

Shunji Ehara; Shuji Nakamura, and Masato Akama, all of Ichihara, Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan

Filed Dec. 30, 1985, Ser. No. 814,922
Int. Cl.[4] C08G *59/24*
U.S. Cl. 528—97 6 Claims

1. An epoxy resin composition comprising an epoxy resin and a curing agent for said resin and optionally a curing accelerator, the improvement of which the epoxy resin is an epoxy resin obtained by reacting dihydroxynaphthalene of formula



with epichlorohydrin.

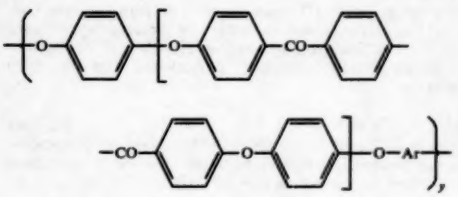
4,687,833

CHAIN-EXTENDED POLY(ARYL ETHER KETONES)

Robert A. Clendinning, New Providence, and George T. Kwiatkowski, Green Brook, both of N.J., assignors to Amoco Corporation, Chicago, Ill.

Continuation of Ser. No. 757,932, Jul. 23, 1985, abandoned. This application Jul. 3, 1986, Ser. No. 882,207
Int. Cl.[4] C08G *8/02*
U.S. Cl. 528—125 11 Claims

1. A poly(aryl ether ketone) of the following formala:



where Ar is a divalent aromatic residue containing electron-withdrawing groups in positions ortho and/or para relative to the carbons bounded to the ether functions with the proviso that Ar cannot be the residuum of 1,4-bis(p-fluorobenzoyl)benzene and y is greater than 1.

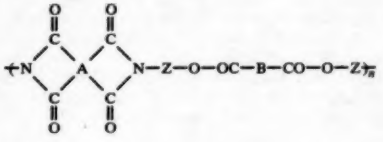
4,687,834

POLYESTER IMIDES AND METHOD FOR PRODUCING SAME

Martin Bartmann, Recklinghausen, and Wolfgang Seeliger, Marl, both of Fed. Rep. of Germany, assignors to Hüls Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Jul. 22, 1986, Ser. No. 888,039
Claims priority, application Fed. Rep. of Germany, Oct. 19, 1985, 3537230
Int. Cl.[4] C08G *69/44, 69/08*
U.S. Cl. 528—291 21 Claims

1. A method for producing polyester imides of the general formula



comprising the steps of:

(i) reacting a tetracarboxylic acid dianhydride of the formula

with a N,N′-bis (Ω-hydroxyalkyl) dicarboxylic acid diamide of the formula, HO—Z—NH—CO—B—CO—NH—Z—OH, and

(ii) removing the water of reaction formed;

wherein A is a quadrivalent aromatic group with 6-32 C atoms, wherein up to 40% of A may be replaced by a quadrivalent aliphatic group with up to 16 C atoms,

B is a divalent aliphatic or aromatic group with up to 14 C atoms,
Z is an alkylene group with 2–3 C atoms, and
n is a number from 3 to 500; and
wherein the reaction temperature is between 150° and 300° C. at the end of the reaction.

4,687,835

COPOLYETHERESTER BASED ON POLY (PROPYLENE OXIDE) GLYCOL BLOCKED WITH ETHYLENE OXIDE

Jacobus J. Zeilstra, Doetinchem, and Ted Brink, Arnhem, both of Netherlands, assignors to Akzo nv, Arnhem, Netherlands

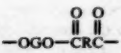
Filed May 16, 1986, Ser. No. 863,787

Claims priority, application Netherlands, May 17, 1985, 8501422

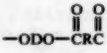
Int. Cl.[4] C08G 63/66

U.S. Cl. 528—300 **8 Claims**

1. A copolyetherester substantially consisting of repeating intralinear long-chain ester units and short-chain ester units which are randomly joined head-to-tail through ester linkages, which long-chain ester units correspond to the formula



and which short-chain ester units correspond to the formula



wherein G represents a divalent radical which remains after removal of terminal hydroxyl groups from a poly(propylene oxide) glycol of which the terminal groups are capped with 15 to 35% by weight of ethylene oxide and which has a molecular weight of 1500 to 2800, and R represents a divalent radical which remains after removal of carboxyl groups from at least one carboxylic acid having a molecular weight of less than 300, and D represents a divalent radical which remains after removal of hydroxyl groups from at least one aliphatic diol having a molecular weight of less than 250, with the proviso that the short-chain ester units comprise at least 75 mole per cent of 1,4-butylene terephthalate units, the short-chain ester units form 25 to 55% by weight of the copolyetherester and the melt index MFI (determined at 230° C. in conformity with ASTM D-1238) is not higher than 50, characterized in that the copolyetherester contains less than 1.5 equivalents of branching agent per 100 moles of dicarboxylic acid and the relative viscosity η_{rel} (1 g polymer in 100 g m-cresol at 25° C.) of the copolyetherester is in the range of 2.45 to 5.0 and the melt index MFI is between

$$0.2 + 157 \times e^{-\left(\frac{\eta_{rel}-0.14}{0.8469}\right)^2}$$

and

$$3.2 + 157 \times e^{-\left(\frac{\eta_{rel}-1.74}{0.8469}\right)^2}$$

6. A process for the preparation of a copolyetherester according to claim 1, which comprises forming a copolyetherester having a relative viscosity of 1.8 to 2.5 by melt condensation, and subjecting the copolyetherester so formed to postcondensation in a stream of an inert gas or in vacuo at a temperature of 170° to 220° C. to obtain a polyetherester having a relative viscosity in the range of 2.45 to 5.0 and a melt index MFI (determined at 230° C. in conformity with ASTM D 1238) between

$$0.2 + 157 \times e^{-\left(\frac{\eta_{rel}-0.14}{0.8469}\right)^2}$$

and

$$3.2 + 157 \times e^{-\left(\frac{\eta_{rel}-1.74}{0.8469}\right)^2}$$

4,687,836

POLYIMIDE ADHESIVES, COATS AND PREPREG

Akira Ibi, Mobara; Takushi Sato, Yokohama; Akihiro Yamaguchi, Kamakura; Shigeru Takahashi, Yokohama; Shigeyuki Shishido, Kamakura; Shoji Tamai, Yokohama, and Hisai Nakajima, Machida, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

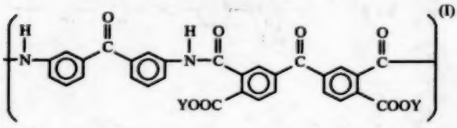
Filed Oct. 10, 1985, Ser. No. 785,996

Claims priority, application Japan, Oct. 15, 1984, 59-214350; Oct. 19, 1984, 59-218598

Int. Cl.[4] C08G 73/10

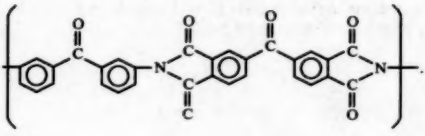
U.S. Cl. 528—353 **14 Claims**

1. A polyimide powder for adhesion and/or coat forming, which comprises polyimide powder being obtained by chemically imidizing a polyamic-acid which is derived from 3,3'-diaminobenzopheonone and 3,3',4,4'-benzophenonetetracarboxylic dianhydride and has recurring unit of the formula (I):



(I)

where Y is a member selected from the group consisting of hydrogen, alkyl and aryl, with an imidizing agent, and having recurring units of the formula (II):



(II)

4,687,837

PROCESS FOR PREPARING PULVERULENT COATING COMPOSITION OF PRACTICALLY UNIFORM GRAIN SIZES AND BASED ON POLYAMIDE HAVING AT LEAST 10 ALIPHATICALLY BOUND CARBON ATOMS PER CARBONAMIDE GROUP

Salih Mumcu, Marl, Fed. Rep. of Germany, assignor to Huls Aktiengelsellschaft, Marl, Fed. Rep. of Germany

Filed Mar. 18, 1986, Ser. No. 840,639

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1985, 3510689

Int. Cl.[4] C08G 69/46

U.S. Cl. 528—496 **11 Claims**

1. A method of producing polyamide powder from polyamide having a relative viscosity of 1.4 to 1.8 as measured in 0.5% meta-cresol solution at 25° C. and at least 70% of said polyamide consisting of polyamide with at least 10 aliphatically bound carbon atoms per carbonamide group, comprising:

(a) dissolving said polyamide in ethanol in a closed vessel having a heated wall and an external receiver at a temperature between about 127° to 135° C. to form a solution of

said polyamide having a concentration of said polyamide up to about 25% by weight in said solution;

(b) distilling and removing said ethanol into said external receiver at a rate sufficient to cool said solution 3° to 30° C. per hour;

(c) simultaneously with step (b) maintaining said heated wall at a temperature equal to or greater than any concurrent solution temperature;

(d) continuing steps (b) and (c) through a precipitation temperature of 100° to 120° C. and thereby precipitating said polyamide; and

(e) separating said precipitated polyamide powder of (d) having 98% by weight of said powder deviating up to about 40% from an average grain diameter.

4,687,838

PROCESS FOR PREPARING PULVERULENT COATING COMPOSITION BASED UPON POLYAMIDE HAVING AT LEAST 10 ALIPHATICALLY BOUND CARBON ATOMS PER CARBONAMIDE GROUP

Salih Mumcu, Marl, and Helmut Winzer, Finnentrop, both of Fed. Rep. of Germany, assignors to Huls Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Mar. 18, 1986, Ser. No. 840,819

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1985, 3510691

Int. Cl.[4] C08G *69/46*

U.S. Cl. 528—496 **8 Claims**

1. In the method of producing polyamide powder from polyamide having a relative viscosity of 1.4 to 1.8 as measured in 0.5% meta-cresol solution at 25° C., and at least 70% of said polyamide consisting of polyamide with at least ten aliphatically bound carbon atoms per carbonamide group comprising:

(a) dissolving said polyamide in at least twice the amount by weight of ethanol in a closed vessel at a temperature between about 130° to 150° C. to form a solution of said polyamide;

(b) cooling said solution to a precipitation temperature between about 100° and 125° C.;

(c) precipitating said polyamide powder from said cooled solution of (b) with agitation and under an inert gas atmosphere; and

(d) separating said precipitated polyamide powders of (c) from said ethanol; the improvement comprising:

(e) rapidly cooling said solution of about 130° to 150° C. to a saturation limit of about 125° C. inside temperature with stirring and distillation of said ethanol under its own pressure;

(f) further cooling said solution below said saturation limit with distillation of said ethanol and cooling with a jacket wherein the jacket temperature is at most 3° C. below said inside temperature up until a precipitation temperature within the range of 90° to 113° C. is reached; and

(g) maintaining said solution in the isothermal state during the ensuing precipitation stage by further distillation of ethanol.

4,687,839

CALCITONIN GENE RELATED PEPTIDE ANALOGS WITH C-TERMINAL D-AMINO ACID SUBSTITUENTS

Tomas G. Kempe, 16604 Windermere Pl., Minnetonka, Minn. 55345

Filed Dec. 23, 1985, Ser. No. 812,893

Int. Cl.[4] C07K *7/10*

U.S. Cl. 530—324 **4 Claims**

1. [D-Ser^{36}] human calcitonin gene-related peptide.

4,687,840

HYPOTENSIVE ACTIVE PEPTIDES

Peter K. T. Pang, and Thomas E. Tenner, Jr., both of Lubbock, Tex., assignors to Texas Tech University Health Sciences Center, Lubbock, Tex.

Filed Feb. 11, 1986, Ser. No. 828,380

Int. Cl.[4] C07K *5/08, 5/06;* C07D *207/00*

U.S. Cl. 530—331 **4 Claims**

1. A hypotensive active peptide having the L-form amino acid sequence:

Pro—Lys;	Lys—Arg—Pro;
Pro—Arg—Arg;	Arg—Lys—Pro;
Pro—Lys—Lys;	Pro—Pro—Arg—Arg;
Pro—Arg—Lys;	Pro—Pro—Arg—Lys;
Pro—Lys—Arg;	Pro—Pro—Lys—Lys;
Pro—Pro—Arg;	Pro—Pro—Lys—Arg;
Pro—Pro—Lys;	Arg—Arg—Pro—Pro;
Lys—Pro—Pro;	Lys—Lys—Pro—Pro;
Lys—Lys—Pro;	Arg—Lys—Pro—Pro; or
	Lys—Arg—Pro—Pro,

and pharmaceutically acceptable salts thereof.

4,687,841

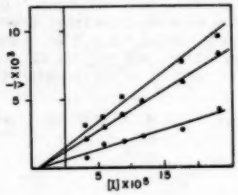
PEPTIDE HYDROXAMIC ACID DERIVATIVES

Curtis A. Spilburg, Chesterfield, and William McC. Moore, St. Charles, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Oct. 18, 1985, Ser. No. 789,271

Int. Cl.[4] C07C *103/52*

U.S. Cl. 530—331 **3 Claims**



1. A peptide hydroxamic acid derivative having the following structural formula:

R-Pro-Leu-Gly-NHOH

wherein R = H or N-protecting group or agarose.

4,687,842

MONOAZO COMPOUNDS HAVING AN IMIDAZOLIUM-2 GROUP LINKED THROUGH AN AZO RADICAL TO A SUBSTITUTED PHENYL GROUP

Beat Henzi, Allschwil, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

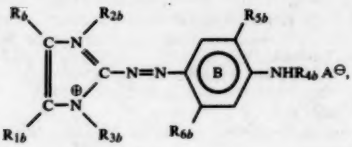
Filed Jan. 14, 1980, Ser. No. 111,794

Claims priority, application Switzerland, May 17, 1977, 6133/77; Mar. 29, 1978, 3344/78

Int. Cl.[4] C09B *29/036, 44/16;* D06P *1/08, 1/41*

U.S. Cl. 534—607 **19 Claims**

1. A compound of the formula



wherein

each R_b and R_{1b} is independently hydrogen or methyl,

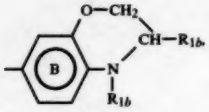
each R_{2b} and R_{3b} is independently methyl, ethyl, 2-hydroxyethyl or 2-hydroxy-n-propyl,

R_{4b} is hydrogen, methyl, ethyl, propyl, n-butyl, 2-ethyl-n-hexyl, 2-hydroxyethyl, 3-hydroxypropyl, 2-hydroxy-n-propyl, 3-methoxy-propyl, 2-cyanoethyl, benzyl, 2-phenylethyl or 2-phenoxyethyl,

R_{5b} is chloro or fluoro,

R_{6b} is hydrogen, chloro or methyl or

R_{4b}, R_{5b} and R_{6b} taken together and with the nitrogen atom to which R_{4b} is attached and with Ring B are



wherein each R_{1b} is hydrogen or methyl, and $A^{\ominus}$ is an anion.

4,687,843

ESTERIFIED PROPOXYLATED GLUCOSE COMPOSITIONS

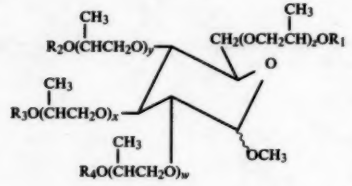
Martin Smolin, Edison, and Stuart B. Polovsky, Matawan, both of N.J., assignors to Amerchol Corporation, Edison, N.J.

Continuation of Ser. No. 755,632, Jul. 16, 1985, abandoned. This application Feb. 26, 1986, Ser. No. 833,818

Int. Cl.[4] A61K *7/42, 31/78, 35/12;* **C07H** *15/00*

U.S. Cl. 536—18.3 **38 Claims**

1. A fatty acid ester of propoxylated methyl glucoside represented by the structural formula:



wherein:

w+x+y+z is from about 5 to 50; and

each R_1, R_2, R_3 and R_4 is individually hydrogen or

wherein M is a C_{11}–C_{29} alkyl or alkenyl, provided that at least one R_1, R_2, R_3 or R_4 is

4,687,844

PROCESS FOR THE DIRECT PREPARATION OF N,N-DISUBSTITUTED DERIVATIVES FOR 4,13-DIAZA-18-CROWN-6

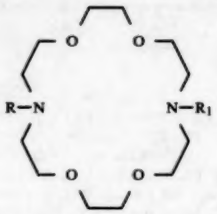
George W. Gokel, Columbia, and Vincent J. Gatto, Silver Spring, both of Md., assignors to University of Maryland, College Park, Md.

Division of Ser. No. 642,985, Aug. 21, 1984, Pat. No. 4,597,903. This application Apr. 11, 1986, Ser. No. 851,044

Int. Cl.[4] C07D *273/08, 413/06*

U.S. Cl. 540—467 **7 Claims**

1. A crown ether of the formula:



wherein R and R_1 are each the same member of the group consisting of 2-methoxybenzyl, allyl, 2-furfurylmethyl, methoxymethylcarboxyl, 2-acetoxybenzyl and 2-hydroxybenzyl.

4,687,845

PREPARATION OF THIAZINE DERIVATIVES

John Hollowood, York; Arthur Jackson, Washington, and Graham Heyes, Durham, all of England, assignors to Fine Organics Limited, Middlesbrough, England

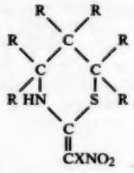
Filed Jan. 13, 1986, Ser. No. 818,271

Claims priority, application United Kingdom, Jan. 14, 1985, 8500863

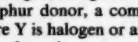
Int. Cl.[4] C07D *279/06*

U.S. Cl. 544—54 **8 Claims**

1. A method for the preparation of a thiazine derivative of the formula



where each R is independently hydrogen or lower-alkyl and X is hydrogen, halogen or lower alkyl, which comprises reacting a sulphur donor, a compound of the formula $Y_2C{=}CXNO_2$ where Y is halogen or another leaving group and a compound of the formula



4,687,846

PYRAZOLIDINONE SALTS AS DEVELOPING AGENTS

Malcolm D. Tirel, Alderley Edge, and William E. Long, Wilmslow, both of England, assignors to Ciba-Geigy AG, Basel, Switzerland

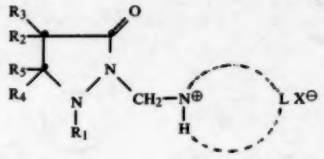
Filed Feb. 28, 1986, Ser. No. 834,985

Claims priority, application United Kingdom, Mar. 15, 1985, 8506803

Int. Cl.[4] C07D *413/06, 401/06*

U.S. Cl. 544—140 **5 Claims**

1. A 1-phenyl-3-pyrazolidinone salt of the formula



in which

$X^{\ominus}$ is an organic anion,

L represents the atoms necessary to complete an unsubstituted pyrrolidine, piperidine or morpholine ring,

R_1 is phenyl which is unsubstituted or substituted by alkyl, alkoxy, chloro, hydroxyl or amino,

R_2 and R_3 are each hydrogen or lower alkyl which is unsubstituted or substituted by hydroxyl, alkoxy, aryloxy or amino, and

R_4 and R_5 are each hydrogen, lower alkyl which is unsubstituted or substituted by hydroxyl, alkoxy, aryloxy or amino, or phenyl which is unsubstituted or substituted by alkyl, alkoxy, chloro, hydroxyl or amino.

4,687,847

PURIFICATION OF RIBOFLAVIN

Johannes Grimmer, Grenaa, Denmark, and Hans C. Horn, Lambsheim, Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 10, 1985, Ser. No. 743,157

Claims priority, application Fed. Rep. of Germany, Jun. 12, 1984, 3421714

Int. Cl.[4] C07D *475/14*

U.S. Cl. 544—251 **9 Claims**

1. A process for the purification of crude riboflavin, comprising

(a) dissolving said crude riboflavin in an aqueous solution of alkali metal hydroxide,

(b) purifying said solution of riboflavin,

(c) introducing said solution into a mixture of water and acid which is at about 90°–100° C., producing an acidic reaction mixture with a pH of about 6.5–0.8, while maintaining the resulting acidic reaction mixture at a temperature of about 90°–100° C.,

(d) heating said acidic reaction mixture at about 90°–100° C. for a further 10–80 minutes, and

(e) cooling said heated reaction mixture and isolating the crystallized riboflavin.

4,687,848

PREPARATION OF 2-AMINOPYRAZINES AND PYRAZINES

Fritz Brunnmueller, Limburgerhof, and Michael Kroener, Mannheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

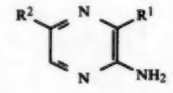
Division of Ser. No. 547,852, Nov. 2, 1983, Pat. No. 4,560,756. This application Jun. 3, 1985, Ser. No. 740,435

Claims priority, application Fed. Rep. of Germany, Nov. 15, 1982, 3242195

Int. Cl.[4] C07D *241/18, 241/20*

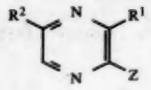
U.S. Cl. 544—336 **8 Claims**

1. A process for the preparation of a mixture of a 2-aminopyrazine of the formula



Ia

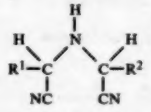
with a pyrazine of the formula



Ib

where the individual groups R^1 and R^2 can be identical or different and each are hydrogen, alkyl of 1 to 20 carbon atoms or said alkyl substituted by halogen, alkenyl of 2 to 20 carbon atoms, cycloalkyl of 5 to 8 carbon atoms, alkylaryl or aralkyl of 7 to 12 carbon atoms or phenyl, Z is halogen when reaction (a) is carried out or the group YR^3, when reaction (b) is carried out, Y being oxygen or sulfur and R^3 being alkyl of 2 to 20 carbon atoms, or cycloalkyl or aralkyl of up to 8 carbon atoms, which process comprises:

cyclizing an α-iminodiacetonitrile of the formula



II

where R^1 and R^2 have the above meanings, by reaction (a) with a hydrogen halide of the formula

III

where X is halogen, or

(b) with an alcohol and/or a thioalcohol of the formula

IV

where Y and R^3 have the above meanings, and a hydrogen halide of the formula

III

where X is halogen.

4,687,849

[(ISOPROPYLIDENEAMINO)OXY]-ETHYL-2-[[6-CHLOROQUINOXALINYL)OXY]PHENOXY]PROPIONATE POSTEMERGENT HERBICIDE

Georg Frater, Greifensee; Milos Suchy, Pfaffhausen; Jean Wenger, Uster, and Paul Winternitz, Greifensee, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Oct. 4, 1985, Ser. No. 784,067

Int. Cl.[4] C07D *241/44;* A01N *43/60*

U.S. Cl. 544—354 **2 Claims**

1. The compound [(isopropylideneamino)oxy]-ethyl-2-[[(6-chloroquinoxalinyl)oxy]phenoxy]propionate.

4,687,850

PURIFICATION OF 1-(2-AMINO-2-ALKYLPROPYL)-3,3,5,5-TETRAALKYL-PIPERAZINONES

Pyong-Nae Son, Akron, and Charles P. Jacobs, Elyria, both of Ohio, assignors to The B.F. Goodrich Company, Akron, Ohio

Filed Dec. 3, 1984, Ser. No. 677,667

Int. Cl.[4] C07D *241/08*

U.S. Cl. 544—384 **7 Claims**

1. In a process for purification of substituted amino-alkyl-piperazinones by fractional distillation, the improvement which comprises carrying out said distillation in the presence of an inorganic base.

4,687,851

POLYURETHANE ELASTOMERS PREPARED FROM HIGH EQUIVALENT WEIGHT POLYAHLS

Michael K. Laughner, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Aug. 15, 1985, Ser. No. 766,152

Int. Cl.[4] C08G *18/48*

U.S. Cl. 544—398 **10 Claims**

1. An amine-initiated polyether having an equivalent weight of at least about 2000 and a level of unsaturation of less than about 0.06 millequivalent per gram.

4,687,852

RADIOACTIVE IODOSPIROPERIDOL

Iwao Nakatsuka, Kobe; Hiroshi Shimizu, Takarazuka, and Akira Yoshitake, Kyoto, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

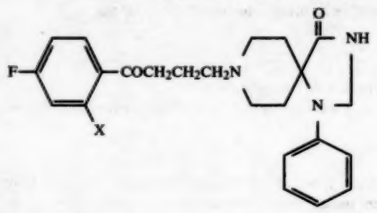
PCT No. PCT/JP84/00257, § 371 Date Oct. 15, 1985, § 102(e) Date Oct. 15, 1985, PCT Pub. No. WO85/05359, PCT Pub. Date Dec. 5, 1985

PCT Filed May 22, 1984, Ser. No. 794,860

Int. Cl.[4] C07D *471/10*

U.S. Cl. 546—20 **4 Claims**

1. A radioactive 2-iodospiroperidol represented by the formula:



(I)

wherein X is a radioactive iodine atom.

4,687,853

IMIDAZO[1,5-A]PYRIDYLMETHANES

Hans-volker Runzheimer, Miles Laboratories, Inc. 1127 Myrtle St., Elkhart, Ind. 46514; Ulrich Nehen, and Gert Jabs, both of Bayer AG, D 5090 Leverkusen, Fed. Rep. of Germany

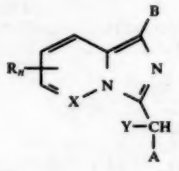
Filed Mar. 8, 1985, Ser. No. 709,623

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1984, 3409440

Int. Cl.[4] C07D *471/04, 401/02;* B41M *3/12*

U.S. Cl. 546—121 **6 Claims**

1. A hetarylmethane leuco dyestuff of the formula



wherein

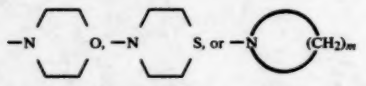
R denotes halogen, C_1–C_5-alkyl or C_1–C_5-alkoxy,

A denotes a phenyl, naphthyl, pyrenyl, anthracyl, perylenyl, biphenylyl, thienyl, pyrryl, imidazolyl, oxazolyl, thiazolyl, pyrazolyl, pyridyl, pyrimidyl, quinolyl, 1,2,3,4,-tetrahydroquinolyl, quinoxalyl, indolyl, 1,2-dihydroquinolyl or benzodioxolyl,

B denotes hydrogen, halogen, C_1–C_5-alkyl, phenyl, C_1–C_4-alkylcarbonyl, benzoyl, mono- or di-C_1–C_5-alkylamino or phenylamino,

X denotes CH,

Y denotes



m denotes 4–6 and

n denotes 0–4

the alkyl radicals and the cyclic radicals being unsubstituted or substituted by fluorine, chlorine, bromine, hydroxyl, C_1–C_8-alkoxy, phenoxy, benzyloxy, pyridyloxy, phenyl, pyrazolinyl, benzoxazolyl, benzofuranyl, triazolyl, C_1–C_4-alkylmercapto, phenylmercapto, benzylmercapto, cyano, carbamoyl, C_1–C_4-alkoxycarbonyl, amino, which in turn are unsubstituted or substituted by 1 or 2 C_1–C_4-alkyl, phenyl, benzyl or phenylethyl groups, C_2–C_4-alkenyloxy, C_1–C_4-alkylcarbonyloxy or benzoyloxy, or the cyclic radicals being substituted by nitro, C_1–C_4-alkyl, C_2–C_6-alkenyl or styryl.

4,687,854

BISPIPERIDONE PRECURSOR OF 2-SUBSTITUTED-5-METHYL-PYRIDINES

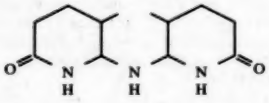
Ludwig A. Hartmann, Wilmington, Del., and John F. Stephen, West Chester, Pa., assignors to ICI Americas Inc., Wilmington, Del.

Division of Ser. No. 807,850, Dec. 11, 1985, Pat. No. 4,658,031, which is a division of Ser. No. 649,423, Sep. 11, 1984, Pat. No. 4,584,380, which is a division of Ser. No. 433,273, Oct. 7, 1982, Pat. No. 4,473,696. This application Dec. 3, 1986, Ser. No. 937,383

Int. Cl.[4] C07D *211/76*

U.S. Cl. 546—261 **1 Claim**

1. The piperidone adduct of the following formula (X):



(X)

4,687,855

CERTAIN 3-TRIFLUOROMETHYL-5-CHLORO-2-PYRIDYLOXY-ANILINE INTERMEDIATES

Manfred Böger, Weil am Rhein, Fed. Rep. of Germany, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

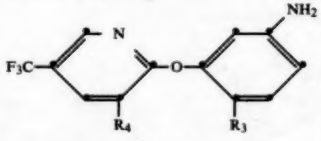
Continuation of Ser. No. 613,537, May 24, 1984, abandoned, which is a division of Ser. No. 439,457, Nov. 5, 1982, abandoned. This application Jan. 17, 1986, Ser. No. 820,817

Claims priority, application Switzerland, Nov. 10, 1981, 7208/81; Oct. 8, 1982, 5925/82

Int. Cl.[4] C07D *213/61, 213/64*

U.S. Cl. 546—300 **4 Claims**

1. A compound of the formula



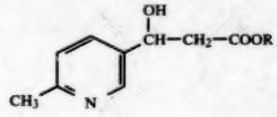
wherein R_3 is methyl, chlorine or bromine; R_4 is chlorine.

4,687,856
3-HYDROXY-3-(2-METHYL-5-PYRIDYL)-PROPIONIC ACID ALKYL ESTERS

James I. Grayson, Durham, England, assignor to Lonza Ltd., Gampel/Valais, Switzerland

Filed Jun. 4, 1986, Ser. No. 870,390
Claims priority, application Switzerland, Jun. 20, 1985, 2614/85
Int. Cl.[4] C07D *213/55*
U.S. Cl. 546—341 3 Claims

1. 3-Hydroxy-3-(2-methyl-5-pyridyl)-propionic acid alkyl ester having the formula:



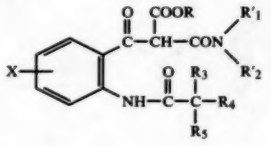
wherein R is a lower alkyl group.

4,687,857
ALKYL β-OXO-BENZENEPROPANOATES

Francois Clemence, and Odile Le Martret, both of Paris, France, assignors to Roussel Uclaf, Paris, France

Filed Oct. 12, 1984, Ser. No. 660,414
Claims priority, application France, Oct. 20, 1983, 83 16699
Int. Cl.[4] C07C *101/447*; C07D *215/22, 239/22, 277/46*
U.S. Cl. 548—195 4 Claims

1. An alkyl β-oxo-benzenepropanoate of the formula



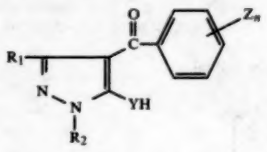
wherein X is in the 5-, 6-, 7- or 8-position and is selected from the group consisting of hydrogen, halogen, alkyl of 1 to 5 carbon atoms, alkoxy of 1 to 4 carbon atoms, CF_3—, CF_3S— and CF_3O—, R_1' is selected from the group consisting of hydrogen and alkyl of 1 to 4 carbon atoms, R_2' is selected from the group consisting of hydrogen, thiazolyl, 4,5-dihydrothiazolyl, pyridinyl, oxazolyl, isoxazolyl, imidazolyl, pyrimidyl, tetrazolyl, thienyl, benzothiazolyl, said heterocycles attached to the nitrogen by a carbon atom and phenyl optionally substituted with at least one member of the group consisting of halogen, alkoxy of 1 to 4 carbon atoms, hydroxy, phenyl, CF_3—, NO_2—, alkyl of 1 to 4 carbon atoms and alkyl of 1 to 4 carbon atoms substituted with amino, alkylamino or dialkylamino with alkyls of 1 to 3 carbon atoms or R_1' and R_2' taken together with the nitrogen atom to which they are attached form thiazole, R is alkyl of 1 to 8 carbon atoms, R_3 is selected from the group consisting of hydrogen, halogen and alkyl of 1 to 4 carbon atoms, R_4 is hydrogen or halogen and R_5 is halogen.

4,687,858
ORGANIC ACID ESTERS OF 4-BENZOYL-5-HYDROXY(MERCAPTO)PYRAZOLES

Takuo Konotsune, Hiromachi, and Katsuhiko Kawakubo, Yasumachi, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

Continuation of Ser. No. 442,443, Nov. 17, 1982, abandoned, which is a continuation of Ser. No. 334,658, Dec. 28, 1981, abandoned, which is a continuation of Ser. No. 132,109, Mar. 20, 1980, abandoned, which is a division of Ser. No. 953,357, Oct. 23, 1978, abandoned, which is a continuation of Ser. No. 838,083, Sep. 30, 1977, Pat. No. 4,146,726, which is a division of Ser. No. 558,682, Mar. 17, 1975, Pat. No. 4,063,925. This application Jan. 15, 1985, Ser. No. 691,757
Claims priority, application Japan, Mar. 28, 1974, 59-34939
Int. Cl.[4] A01N *43/56*; C07D *231/18, 231/20*
U.S. Cl. 548—243 9 Claims

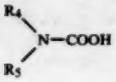
1. An ester of a compound having the formula



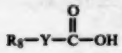
wherein
R_1 represents hydrogen atom or a lower alkyl group,
R_2 represents a lower alkyl group or a lower alkenyl group,
n is an integer of 1 to 4,
Z represents a halogen atom, nitro group, a lower alkyl group, a halogenated lower alkyl group, a lower alkoxy group, a lower alkanesulfonyl group, cyano group, a lower alkylthio group, an alkanoyl group having 2–5 carbon atoms, or benzoyl group, and when n is 2, 3, or 4, Z's may be the same or different, and
Y represents oxygen atom or sulfur atom,
with the proviso that when
Y is oxygen, and
Z is a halogen, there must be 2, 3 or 4 such halogen substituents, and
Z is a lower alkyl, there must be 3 or 4 such lower alkyl substituents, and
Z is a lower alkoxy, there must be 3 or 4 such lower alkoxy substituents, and
Z is a cyano, there are 2, 3 or 4 cyano substituents;
with an organic acid selected from the group consisting of:
carboxylic acids having the formula

R_3COOH

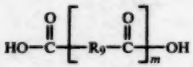
wherein
R3 is an alkyl group having 1 to 17 carbon atoms,
a halogenoalkyl group having 1 to 4 carbon atoms and 1 to 4 halogen atoms,
an alkenyl group having 2 to 17 carbon atoms,
a 5–7 membered cycloalkyl group,
a phenyl group optionally having 1 to 3 substituents selected from the group consisting of nitro, a halogen, and
a C_{1-4} alkyl,
a phenylalkyl group having 1 to 5 carbon atoms in the alkyl moiety and optionally having 1 to 3 substituents selected from the group consisting of nitro and a halogen in the phenyl moiety,
styryl group or
a phenoxyalkyl group having 1 to 3 carbon atoms in the alkyl moiety and optionally having 1 or 2 substituents selected from the group consisting of a halogen and methyl in the phenyl moiety;
carbamic acids having the formula:



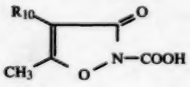
wherein
R_4 and R_5 each is an alkyl group having 1 to 4 carbon atoms or jointly form pentamethylene group; carbonic or thiocarbonic acid monoesters having the formula:



wherein
R_8 is an alkyl group having 1 to 4 carbon atoms, phenyl group or a phenylalkyl group having 1 or 2 carbon atoms in the alkyl moiety and optionally having 2 to 3 substituents selected from the group consisting of nitro and a halogen, and
Y is oxygen or sulfur atom;
dibasic acids having the formula:



wherein
R_9 is an alkylene group having 1 to 10 carbon atoms, vinylene group or a phenylene group or both C=O groups may be linked without the R_9, and
m is 0 or 1;
and 3-oxo-4-isoxazolin-2-yl carboxylic acids having the formula:



wherein
R_{10} is hydrogen atom or a halogen atom.

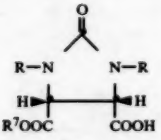
4,687,859

MONOESTERS OF IMIDAZOLIDINONE DICARBOXYLIC ACIDS

Horst Pauling, Bottmingen, and Christof Wehrli, Birsfelden, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed May 15, 1985, Ser. No. 734,307
Claims priority, application Switzerland, May 18, 1984, 2458/84; Feb. 22, 1985, 825/85
Int. Cl.[4] C07D 233/28
U.S. Cl. 548—321 **4 Claims**

1. An optically active compound of the formula

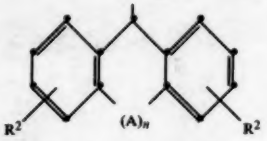


IV

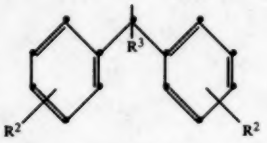
wherein R is benzyl; R^7 is a residue of the formula

and R^1 is a residue of the formula

(a)



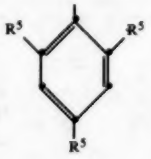
(b)



(c)

(d)

(e)



or

(f)

in which R^2 is hydrogen, halogen, lower alkyl or lower alkoxy; R^3 is hydrogen or hydroxy or, when R^2 in the residue (b) is hydrogen, R^3 also can be lower alkyl, lower alkoxy or phenyl; R^4 is cycloalkyl selected from the group consisting of cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl and cycloheptyl, thienyl, 2-furyl or phenyl which phenyl is unsubstituted or substituted with chlorine or methyl; R^5 is hydrogen or lower alkyl; R^6 is lower alkyl or phenyl; A is sulphur or methylene, B is sulphur, $—SO_2—$ or methylene; and n is the integer 1 when A is sulphur or n is the integer 1 or 2 when A is methylene.

4,687,860

SUBSTITUTED 2,3,4,9-TETRAHYDRO-1H-CARBAZOLE-1-ACETIC ACID

Dominick Mobilio; Christopher A. Demerson, both of Plainsboro, and Leslie G. Humber, North Brunswick, all of N.J., assignors to American Home Products Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 830,598, Feb. 18, 1986, which is a division of Ser. No. 797,561, Nov. 13, 1985, Pat. No. 4,616,028, which is a continuation-in-part of Ser. No. 726,197, Apr. 22, 1985, abandoned. This application Aug. 26, 1986, Ser. No. 900,488

The portion of the term of this patent subsequent to Oct. 7, 2003, has been disclaimed.

Int. Cl.[4] C07D *209/82*

U.S. Cl. 548—439 4 Claims

1. The compounds designated 1-ethyl-7,8-difluoro-2,3,4,9-tetrahydro-4-(2-propenyl)-1H-carbazole-1-acetic acid and the pharmaceutically acceptable salts thereof.

2. The compound according to claim 1 designated cis-1-ethyl-7,8-difluoro-2,3,4,9-tetrahydro-4-(2-propenyl)-1H-carbazole-1-acetic acid and the pharmaceutically acceptable salts thereof.

4,687,861

MICROBICIDAL COMPOSITIONS

Pierre Martin, Rheinfelden, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

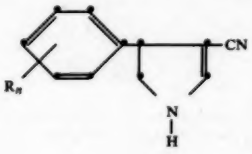
Filed Nov. 22, 1985, Ser. No. 800,845

Claims priority, application Switzerland, Nov. 28, 1984, 5677/84

Int. Cl.[4] C07D *207/22*

U.S. Cl. 548—565 5 Claims

1. A process for producing a compound of the formula

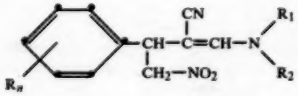


wherein

R is halogen, C1–C6-alkyl or C1–C6-haloalkyl, and

n is 0, 1 or 2,

which process comprises reacting with hydrogen a compound of the formula



wherein

R1 and R2 independently of one another are each C1–C4-alkyl, or together with the adjacent nitrogen atom are pyrrolidinyl or piperidinyl, or with an additional oxygen atom are morpholinyl,

under a nitrogen pressure of 1 to 150 bar, in the presence of a catalyst suitable for catalyzing hydrogen reduction, at a temperature of between 0 and 150 degrees Centigrade and in an organic solvent or solvent mixture; and optionally completing the reaction in a weakly acid medium.

4,687,862

FLUORAN COMPOUNDS

Takeo Obitsu, Ohmiya; Tetsuo Igaki, Kawagoe; Kimiaki Kinoshita, Kitamoto; Morio Nanbu, Fujimi, and Shinichi Satoh, Tokyo, all of Japan, assignors to Shin Nisso Kako Co., Ltd., Japan

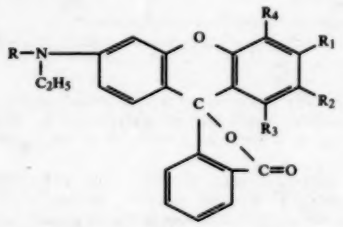
Division of Ser. No. 849,759, Apr. 8, 1986. This application Oct. 14, 1986, Ser. No. 918,472

Claims priority, application Japan, Apr. 18, 1985, 60-81361; Feb. 21, 1986, 61-35094

Int. Cl.[4] C07D *493/10*

U.S. Cl. 549—224 6 Claims

1. A fluoran compound of the formula



wherein R represents an isobutyl or isopentyl group, R_1 represents a hydrogen or halogen atom or an alkyl group, R_2 represents a hydrogen or halogen atom or an alkyl group, R_3 represents a hydrogen atom, and R_4 represents a hydrogen atom, or R_4 and R_1 or R_2 and R_3 taken together with the carbon atoms to which they are attached may from a benzene ring optionally substituted with a halogen atom. with the proviso that at least one of R_1 and R_2 is a halogen atom when neither forms a benzene ring.

4,687,863

OPTICALLY ACTIVE HYDROXYIODOLACTONE

Yutaka Nakazono, Osaka, and Kenji Mori, Tokyo, both of Japan, assignors to Nitto Electric Industrial Co., Ltd., Osaka, Japan

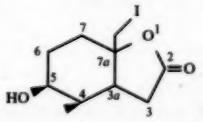
Filed Jun. 5, 1986, Ser. No. 871,217

Claims priority, application Japan, Dec. 10, 1985, 60-278824

Int. Cl.[4] C07D *307/83*

U.S. Cl. 549—302 3 Claims

1. An optically active hydroxyiodolactone represented by the formula



wherein the stereochemistry of the 3a-, 5- and 7a- positions is either (3aR,5S,7aS) or (3aS,5S,7aR).

4,687,864

5-FLUORO-3-OXA-PROSTACYCLIN COMPOUNDS

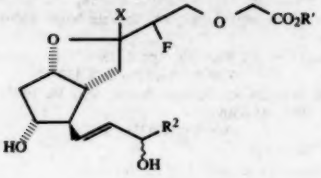
Stevan W. Djuric, Evanston; Leland J. Chinn, and Kurt J. Rorig, both of Glenview, all of Ill., assignors to G. D. Searle & Co., Skokie, Ill.

Continuation of Ser. No. 565,250, Dec. 23, 1983, Pat. No. 4,579,958. This application Sep. 18, 1985, Ser. No. 777,124

Int. Cl.[4] C07D *309/06, 307/935*

U.S. Cl. 549—414 13 Claims

1. A compound of the formula:



wherein R^1 is:

(a) a pharmaceutically acceptable cation;

(b) a branched or straight chain alkyl group of 1 to 6 carbon atoms;

(c) hydrogen;

(d) a NR^3_2 group with the adjacent connecting oxygen omitted, wherein each R^3, which may be identical or different, is hydrogen, a methyl or an ethyl group;

R^2 is:

(a) an aliphatic hydrocarbon group of 1 to 8 carbon atoms which is saturated or optionally contains 1 or 2 carbon-carbon unsaturated bond(s) and optionally substituted by a methyl, dimethyl or fluorine;

(b) a cycloaliphatic group of 4 to 7 ring carbon atoms which is saturated or optionally contains 1 carbon-carbon unsaturated bond and optionally has a ring carbon atom replaced by sulphur or oxygen;

(c) a phenyl group;

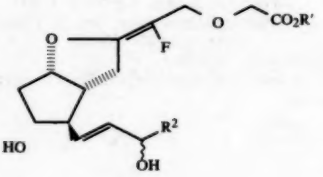
(d) a benzyl group;

(e) a $-(CH_2)_m-R^4$ group wherein m is an integer from 1 to 6 and R^4 is an alkoxy or cycloalkyl group; wherein the OH group on carbon 15 is optionally on carbon 16;

X is OCH_3 or OC_2H_5;

wherein the hydroxy group on carbon 15 is in either the R or S configuration.

8. A compound of the formula:



wherein R^1 is:

(a) a pharmaceutically acceptable cation;

(b) a branched or straight chain alkyl group of 1 to 6 carbon atoms;

(c) hydrogen;

(d) a NR^3_2 group with the adjacent connecting oxygen omitted, wherein each R^3, which may be identical or different, is hydrogen, a methyl or an ethyl group;

R^2 is:

(a) a cycloaliphatic group of 4 to 7 ring carbon atoms which is saturated or optionally contains one carbon-carbon unsaturated bond and optionally has a ring carbon atom replaced by sulphur or oxygen;

(b) a $-(CH_2)_m-R^4$ group wherein m is an integer from 1 to 6 and R^4 is an alkoxy or cycloalkyl group; wherein the OH group on carbon 15 is optionally on carbon 16;

wherein the hydroxy group on carbon 15 is in either the R or S configuration.

4,687,865

PROCESS FOR PREPARING 7-OXABICYCLOHEPTANE AMINO-ALCOHOL INTERMEDIATES USEFUL IN MAKING THROMBOXANE A2 RECEPTOR ANTAGONISTS

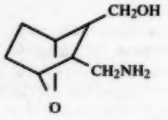
John K. Thottathil, Trenton, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Jun. 4, 1986, Ser. No. 870,564

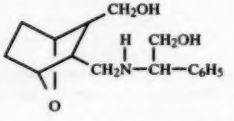
Int. Cl.[4] C07D *307/00*

U.S. Cl. 549—463 **2 Claims**

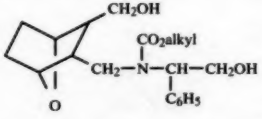
1. A method for preparing 7-oxabicyclo-heptane amino-alcohol compounds of the structure



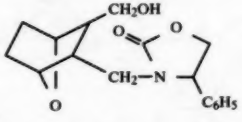
including the (D) isomer or the (L) isomer, which comprises treating a compound of the structure.



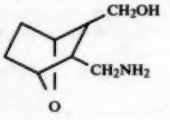
including (D) or (L) isomer with an alkylchloroformate and a base to form an alcohol compound of the structure



including the (D) or (L) isomer, treating the so-formed alcohol with an alkali metal alkoxide to form the alcohol



(including the (D) or (L) isomers) and then treating the above alcohol with alkali metal and liquid ammonia and then with acid to form the amino alcohol



including (D) or (L) isomer.

4,687,866

LIGAND EXCHANGE PROCESS FOR PRODUCING ALKYL DIARYL PHOSPHINE RHODIUM CARBONYL HYDRIDES

Alexis A. Oswald, Mountainside, N.J.; Torris G. Jermasen, Staten Island, N.Y.; Andrew A. Westner, Paramus, and I-Der Huang, West Paterson, both of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Division of Ser. No. 742,127, Jun. 6, 1985, which is a continuation of Ser. No. 374,548, May 3, 1982, abandoned, Division of Ser. No. 120,971, Feb. 12, 1980, which is a continuation-in-part of Ser. No. 11,238, Feb. 12, 1979, Pat. No. 4,298,541. This application Jun. 28, 1985, Ser. No. 749,807

Int. Cl.[4] C07F *15/00*

U.S. Cl. 556—18 5 Claims

1. A method for preparing a tris-(alkyl diaryl phosphine) rhodium carbonyl hydride complex product of the formula $(Ar_2PCH_2CH_2R)_3RH(CO)H$ via ligand exchange comprising reacting, at a temperature between 10° and 175° C., a rhodium salt or rhodium carbonyl complex with hydrogen and carbon monoxide and an amount of alkyl diaryl phosphine ligand in excess of that stoichiometrically required to produce said tris-phosphine complex product, the ligand having the formula $Ar_2PCH_2CH_2R$ and wherein Ar is a substituted or unsubstituted C_6 to C_{10} aryl group and R is a C_4 to C_{28} substituted or unsubstituted alkyl group or a C_6 to C_{10} substituted or unsubstituted aryl group.

4,687,867

METALLOTETRADECADIENE COMPOUNDS

Dennis S. Banasiak; Edward C. Mozdzen, and Jim D. Byers, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 711,891, Mar. 14, 1985, Pat. No. 4,609,498. This application Apr. 14, 1986, Ser. No. 851,752

Int. Cl.[4] C07F *3/02, 5/02, 5/06, 7/00*

U.S. Cl. 556—52 8 Claims

1. 1-Metallo-5,9-tetradecadiene having the empirical formula $C_{14}H_{25}M$, wherein M is selected from the group consisting of MgX, MgR', BR_2, AlR_2, and $(Ar)_2Zr(X)$, wherein X is Cl, Br or I, each R is independently a C_1 to C_{10} carbon radical wherein at least one R group is selected from the group consisting of secondary and tertiary alkyl groups, and each R can be connected to the other as part of a ring structure; R' is a C_2 to C_{10} carbon radical and Ar is an aromatic ligand having 5–10 carbon atoms.

4,687,868

PRODUCTION OF MOLYBDENUM DIOXO DIALKYLENEGLYCOLATE COMPOSITIONS FOR EPOXIDATION OF OLEFINS

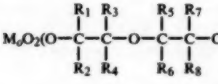
Wilfred P. Shum, Swarthmore, and Charles F. Cooper, Paoli, both of Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Division of Ser. No. 668,059, Nov. 5, 1984, Pat. No. 4,607,113. This application Apr. 23, 1986, Ser. No. 854,953

Int. Cl.[4] C07F *11/00*

U.S. Cl. 556—57 5 Claims

1. A molybdenum dioxo dialkyleneglycolate compound of the formula:



(I)

wherein at least one member of R_1 through R_4 and at least one member of R_5 through R_8 is an alkyl radical of 1 to 4 carbon atoms and the remaining members of R_1 through R_4 and R_5 through R_8 are each independently selected from a group consisting of hydrogen or an alkyl radical of 1 to 4 carbon atoms.

4,687,869

METAL SALICYLATES, PROCESS FOR THEIR PREPARATION AND USE THEREOF AS COLOR DEVELOPERS IN PRESSURE-SENSITIVE OR HEAT-SENSITIVE RECORDING MATERIALS

Hermann Nachbur, Reinach, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

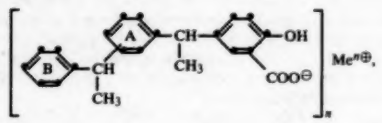
Filed Oct. 11, 1985, Ser. No. 786,458

Claims priority, application Switzerland, Oct. 22, 1984, 5046/84

Int. Cl.[4] C07F *3/06, 5/06*

U.S. Cl. 556—132 6 Claims

1. A metal salicylate of the formula



(I)

wherein

Me is a metal ion of valency n,

n is 2, 3 or 4, and

each of the rings A and B independently of the other is unsubstituted or substituted by halogen, lower alkyl, lower alkoxy or an α-methylbenzyl radical.

4,687,870

PLATINUM/TRIENE COMPLEXES USEFUL FOR HYDROSILYLATION CATALYSIS

Jacques Cavezzan, Villeurbanne, France, assignor to Rhone-Poulenc Specialites Chimiques, Courbevoie, France

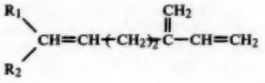
Filed Dec. 20, 1985, Ser. No. 811,393

Claims priority, application France, Dec. 20, 1984, 84 19508

Int. Cl.[4] C07F *15/00*

U.S. Cl. 556—136 6 Claims

1. A platinum/olefin complex comprising halogen values, the olefin moiety thereof which comprises an aliphatic triene having the general formula:



(I)

wherein R_1 is a linear or branched chain alkyl radical having from 1 to 6 carbon atoms, and R_2 is R_1 or a linear or branched chain alkenyl radical having from 2 to 16 carbon atoms and at least one site of ethylenic unsaturation, and said complex having a ratio, in gram-atoms of halogen to gram-atoms of platinum, ranging from virtually 0 to 4.

4,687,871

PROCESS FOR THE RESOLUTION OF A RACEMATE

Alan E. Comyns, Chester; Gareth W. Morris, Spital Wirral, and John P. Sankey, Great Sankey Warrington, all of England, assignors to Laporte Industries Limited, London, England

Filed Nov. 7, 1985, Ser. No. 796,002

Claims priority, application United Kingdom, Nov. 17, 1984, 8429121; Apr. 2, 1985, 8508619

Int. Cl.[4] C07F *1/08;* C07C *51/15, 147/00*

U.S. Cl. 556—138 21 Claims

1. A process for the resolution of a racemate of a compound by stereoselective adsorption on a solid adsorbent characterised by the use of a crystalline molecular sieve material having an asymmetrical crystal structure as the adsorbent.

4,687,872

PROCESS FOR THE PREPARATION OF URETHANES

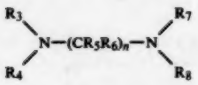
John H. Grate, and David R. Hamm, both of Mountain View, Calif., assignors to Catalytica Associates, Mountain View, Calif. and Haldor Topsoe A/S, Copenhagen, Denmark

Filed Dec. 9, 1985, Ser. No. 806,389
Int. Cl.[4] C07C *125/065, 125/073*
U.S. Cl. 560—25 **24 Claims**

1. A process for converting a nitrogen-containing organic compound, selected from the group consisting of nitro, nitroso, azo, and azoxy compounds, into the corresponding urethane, by reacting a solution, comprising said nitrogen-containing organic compound and a hydroxyl-containing organic compound, with carbon monoxide, which comprises the step of:

(a) contacting the solution with carbon monoxide, in the presence of a rhodium catalyst comprising a polyamino ligand having at least two tertiary amino groups capable of coordinating with rhodium at conditions sufficient to convert said nitrogen-containing organic compound into the corresponding urethane,

wherein said polyamino ligand is selected from the group of compounds represented by the general formula:



wherein R_3, R_4, R_7, and R_8, which may be the same or different, each represent an alkyl, aryl, alkaryl or aralkyl group which may be substituted by one or more inert substituents or R_3 and R_4 and/or R_7 and R_8 may form a ring stucture together with the atom N to which they are attached; R_5 and R_6, which may be the same or different, each represent a hydrogen atom or a lower alkyl group and may form a ring structure together with the atom N and R_3, R_4, R_7 and/or R_8 and n is an integer.

4,687,873

DERIVATIVES OF β-ADRENERGIC ANTAGONISTS

Murray Goodman; Debra Marr-Leisy, both of La Jolla; Roberto P. Rosenkranz, Menlo Park; Kenneth L. Melmon, Woodside, and Michael S. Verlander, Del Mar, all of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Continuation of Ser. No. 463,498, Feb. 3, 1983, abandoned. This application May 10, 1985, Ser. No. 733,391
Int. Cl.[4] C07C *125/06, 103/00*
U.S. Cl. 560—28 **2 Claims**

1. The compound N^{α}-acetyl-p-{6-(3-[1-naphthyloxy]-2-hydroxypropylamino)-heptanoylamino}-L-phenylalanyl-3-hydroxypropylamide and pharmaceutically acceptable salts thereof.

4,687,874

SELECTIVE HYDROFORMYLATION PROCESS USING ALKYL DIARYL PHOSPHINE RHODIUM CARBONYL HYDRIDE CATALYSTS

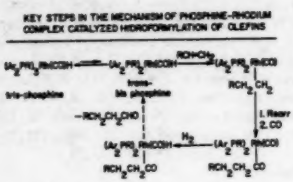
Alexis A. Oswald, Mountainside, N.J.; Torris G. Jermasen, Staten Island, N.Y.; Andrew A. Westner, Paramus, and I-Der Huang, West Paterson, both of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Feb. 12, 1980, Ser. No. 120,971
Int. Cl.[4] C07C *45/50*
U.S. Cl. 568—454 **28 Claims**

1. A continuous hydroformylation process comprising the steps of reacting a feed containing one or more C_2–C_{14} olefinic compounds with H_2 and CO to produce aldehydes having one more carbon atom than said olefinic compounds at a temperature between about 90° and 175° C. under a pressure ranging from 1 to 1000 psig in a liquid reaction mixture comprising:

(1) a soluble non-charged, non-chelated, silicon free, primary alkyl diaryl phosphine complex, having no reactive halogen, of the formula

$$(Ar_2P(CH_2)_mE^yR_{1-y})_3Rh(CO)H$$

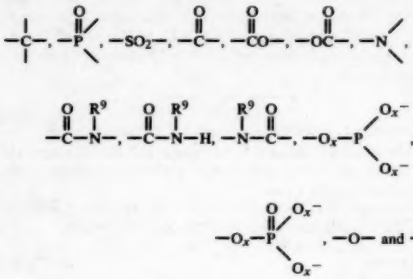


wherein

Ar is an aryl group,

m is 2 to 22,

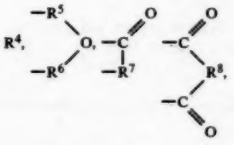
E is a member selected from a covalent bond,



wherein R^9 is a member selected from H, an alkyl group containing from 1 to 30 carbon atoms and an aryl group containing from 6 to 10 carbon atoms, and wherein x is an integer of 0 or 1 with the proviso that at least one x is 1;

y represents the bonds of the group E available for bonding to said Q and R groups;

R represents a member selected from an alkyl group containing from 1 to 30 carbon atoms and an aryl group containing from 6 to 10 carbon atoms, withthe proviso that when E is a covalent bond and R is unsubstituted alkyl, Q and R form an alkyl radical containing at least 6 carbon atoms, and when E is —N<, R also represents a member selected from



which together with the N atom forms a heterocyclic ring, wherein R^4, R^5, R^6, R^7 and R^8 are hydrocarbyl radicals such that said heterocyclic ring contains from 5 to 6 atoms, and

(2) a non-complexed alkyl diaryl phosphine ligand of the formula

$$Ar_2P(CH_2)_mE^yR_{y-1}$$

in an amount such that the non-complexed ligand to rhodium molar ratio is greater than 100.

4,687,875

METAL COORDINATION COMPLEXES OF HETEROPOLYACIDS AS CATALYSTS FOR ALCOHOL CONVERSION

Janie K. Currie, Russell; Arthur J. Cooper, Garfield Heights, and Frederick A. Pesa, Aurora, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Division of Ser. No. 724,139, Apr. 17, 1985. This application Apr. 21, 1986, Ser. No. 854,271

Int. Cl.[4] C07C *1/20*

U.S. Cl. 585—469 9 Claims

1. A process for the conversion of aliphatic oxygen containing organic compounds to hydrocarbons comprising:

(a) passing an aliphatic oxygen containing organic compound at an elevated temperature for a time sufficient to convert said organic compound to said hydrocarbons over a catalyst having the formula:

$$[ML_q]_b{}^{m+}[N]_d{}^{n+}[X^{p+}Y_aZ_{(12-a)}O_{40}]^{-(8-p)}$$

wherein:

[ML] is an organometallic compound where M is at least one metal selected from Group IIIA, IVA, VA, IB, IIB, IVB, VB, VIA, Fe, Co and Ni; and L is an organic ligand selected from aniline, triethanolamine triazine, benzyltrimethylammonium, benzylamino, cyclopentadienyl, and trimethyl (cyclopentadienylmethylene) ammonium,

N is a selected from Na^+, Li^+, Cs^+, Ag^+, NH_4^+, Cu^{+2}, and Mn^+

X is at least one element selected from P, Si, As, Ti, Zr, B, Co, Cu or Sn.

Y and Z are independently selected from W, Mo or V,

$m+n=8-p$

$q=1-6$

$o<a\leqq 12$

$o\leqq d<3$

$b=1$ to 3, and

(b) recovering said hydrocarbon product.

4,687,876

PRODUCTION OF 1,7-OCTADIENE FROM BUTADIENE

Kenzie Nozaki, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 144,806, Apr. 29, 1980, abandoned, which is a continuation-in-part of Ser. No. 16,211, Mar. 5, 1979, abandoned, which is a continuation-in-part of Ser. No. 890,116, Mar. 27, 1978, abandoned. This application Mar. 16, 1984, Ser. No. 589,407

Int. Cl.[4] C07C *2/18*

U.S. Cl. 585—509 6 Claims

1. In the process for preparing 1,7-octadiene by hydrodimerizing 1,3-butadiene in the presence of a solubilized palladium catalyst, a tertiary phosphine, formic acid, a base and optionally an organic solvent wherein the temperature ranges from about 0° C. to about 100° C., the solubilized palladium ranges from about 10^{-1} to about 10^{-6} molar, the mole ratio of tertiary phosphine to solubilized palladium is at least 1 and the molar ratio of base to formic acid is at least 1, the improvement which comprises utilizing as a co-catalyst a metal catalyst supported on an inert carrier wherein said metal is selected from the group consisting of palladium, platinum, rhodium, and mixtures thereof and is present on the carrier in amounts ranging from about 0.0001 to about 30 percent by weight of total supported catalyst, and the ratio of the metal in the supported catalyst to the solubilized palladium ranges from about 0.0035 to about 0.35.

4,687,877

PROCESS FOR DIMERIZATION

William J. Bartley, Charleston, and Werner C. von Dohlen, deceased, late of Charleston, both of W. Va. (by Helga E. von Dohlen, executrix), assignors to Union Carbide Corporation, Danbury, Conn.

Continuation-in-part of Ser. No. 845,314, Mar. 28, 1986, abandoned. This application Jun. 30, 1986, Ser. No. 880,033

Int. Cl.[4] L07C *2/24*

U.S. Cl. 585—516 3 Claims

1. A process for the dimerization of propylene or a C_4 olefin or the codimerization of ethylene with propylene or a C_4 olefin comprising passing the olefins(s) in contact with a catalyst comprising (a) elemental potassium and (b) elemental copper, and (c) an alpha-alumina support therefor, wherein:

(i) the potassium is present in the catalyst in an amount in the range of about 2 to about 5 percent by weight based on the weight of the catalyst;

(ii) the ratio of copper to potassium, by weight, is in the range of about 0.1 to one to about 5 to one;

(iii) the surface area of the support is in the range of about 0.2 square meters per gram to about 5 square meters per gram; and

(iv) the process is carried out in the gas phase at a temperature in the range of about 75° C. to about 225° C. and at a pressure in the range of about atmospheric pressure to about 10,000 psig.

4,687,878

SEPARATION OF HYDROCARBONS USING MAGNETIZABLE ADSORBENTS

Dominicus J. M. van der Vleugel, Rosmalen; Klaas Hoving, Hellevoetsluis, both of Netherlands; Theodorus M. Wortel, Houston; Ronald E. Rosensweig, Summit, both of Tex., and Lovat V. C. Rees, Chiselhurst, United Kingdom, assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Division of Ser. No. 623,728, Jun. 22, 1984, Pat. No. 4,617,282. This application May 7, 1986, Ser. No. 860,564

Claims priority, application United Kingdom, Jun. 24, 1983, 8317228

Int. Cl.[4] C07C *7/13*

U.S. Cl. 585—820 12 Claims

1. A method of separating a hydrocarbon component from a fluid feedstream containing mixed hydrocarbon components comprising:

(a) providing a bed of magnetizable adsorbent zeolite composite particles which are fluidized by a flow of fluid therethrough under fluidizing conditions, said particles being capable of selectively adsorbing said hydrocarbon component from said feedstream;

(b) applying a magnetic field to the bed at a strength sufficient to suppress solids backmixing;

(c) adsorving at least a portion of said hydrocarbon component from said feedstream by passing the feedstream through the bed; and

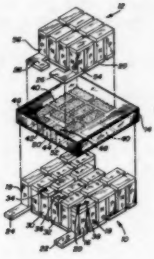
(d) desorbing said hydrocarbon component from said bed, said magnetizable adsorbent zeolite composite particles having been prepared according to a process which comprises introducing discrete magnetizable particles having a maximum particle size of 500 μm into a reaction mixture for forming the zeolite prior to initiating crystallization and thereafter heating the resulting reaction mixture to the crystallization temperature in a manner and under conditions sufficient to cause the zeolite to crystallize on the surface of the magnetizable particles.

4,687,879

TIERED THERMOELECTRIC UNIT AND METHOD OF FABRICATING SAME

Terry J. Hendricks, Garland, Tex., assignor to Varo, Inc., Garland, Tex.

Filed Apr. 25, 1985, Ser. No. 727,341
Int. Cl.[4] H01L *35/28*
U.S. Cl. 136—212 26 Claims



1. A method of fabricating a thermoelectric unit employing a first and second thermoelectrc stage of the type having a plurality of first conductivity type elements and a plurality of second conductivity elements electrically connected alternatingly between said first conductivity type elements to form a series of thermal elements, comprising the steps of:

forming a first interstage electrical connection pad on said first stage;

forming a second interstage electrical connection pad on said second stage;

arranging said first and said second thermoelectric stages in a superposed relationship;

interposing a unitary planar thermally conductive and electrically isolating coupler between said first and said second thermoelectric stages;

forming an electrically conductive path on said coupler for connecting said first and said second interstage electrical connection pads together; and

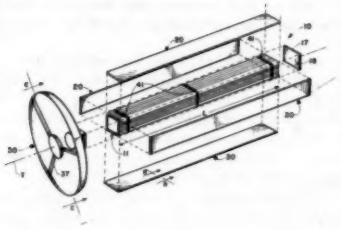
bonding the interstage electrical connection pads of said first and said second thermoelectric stage to said conductive path to thereby form an electrical circuit and a thermally conductive path between said stages.

4,687,880

TUBULAR LUMINESCENCE PHOTOVOLTAIC ARRAY

Robert K. Morris, Colorado Springs, Colo., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 3, 1986, Ser. No. 926,061
Int. Cl.[4] H02N *6/00;* H01L *25/02*
U.S. Cl. 136—246 11 Claims



1. A photovoltaic solar cell system comprising:

(a) a hollow light tube of substantially optically transparent material, said tube having preselected length and first and second ends and including four substantially identical walls of preselected width having flat inner intersecting surfaces defining along a central axis a passageway of generally square cross section extending between said ends, said walls having on the outer surfaces thereof a plurality of triangularly shaped grooves extending along the length of said tube, said grooves defining a plurality of ridges having triangular cross section and extending along the length of said tube, said triangular cross section of each ridge having an apex angle of 90° and the surfaces of said ridges along the length of said tube defining an angle of 45° with said inner surfaces of said walls;

(b) optical means operatively connected to said first end of said tube for directing light into said tube at said first end;

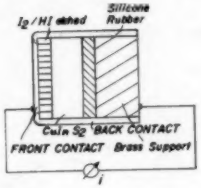
(c) a plurality of solar cells each having a front photoactive surface and a back surface disposed in a rectangular array corresponding in size to the preselected width of said walls and length of said tube, said cells disposed on the outer surfaces of said walls of said tube with said front photoactive surfaces of said cells facing inwardly of said tube.

4,687,881

SOLAR CELLS BASED ON $CuInS_2$

Hans Goslowsky; Hans-Joachim Lewerenz; Manuel S. Fiechter, and Karl-Dieter Husemann, all of Berlin, Fed. Rep. of Germany, assignors to Hahn-Meitner-Institut Berlin GmbH, Berlin, Fed. Rep. of Germany

Filed May 9, 1986, Ser. No. 861,516
Claims priority, application Fed. Rep. of Germany, May 10, 1985, 3517464; Oct. 10, 1985, 3536413
Int. Cl.[4] H01L *31/06;* H01M *6/36*
U.S. Cl. 136—255 14 Claims



1. A solar cell comprising a cell body with a photoanode based on $CuInS_2$ semiconductor material, and having inclusions of extraneous phases, including at least one of In_2S_3, In, and $Cu_{2-x}S$ where $0 \leqq x \leqq 1$, in a concentration between 5 per thousand and 5 percent, and an energy gap of about 1.5 eV.

4,687,882

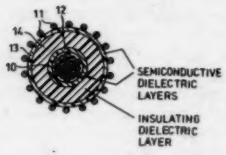
SURGE ATTENUATING CABLE

Gregory C. Stone, 25 Holloway Road, Toronto, Ontario, Canada (M9H 1E9); Steven A. Boggs, 63 Pears Avenue, Toronto, Ontario, Canada (M5R 1S9), and Jean-Marie Braun, 32 Hudson Drive, Toronto, Ontario, Canada (M4T 2J9)

Filed Apr. 28, 1986, Ser. No. 856,383
Int. Cl.[4] H01B *7/34*
U.S. Cl. 174—102 SC 16 Claims

1. A shielded power cable comprising inner and outer conductors separated by a cable insulation system, the cable insulation system comprising at least two coaxial layers defining a displacement current path between the conductors for high frequency currents, namely an inner semiconductive layer presenting a conductance G_1 and a capacitance C_1 per unit length of cable, and an outer insulating layer presenting a capacitance C per unit length of cable, wherein the conductivi-

ty, relative permittivity, and thickness of said inner semiconductive layer are such that the power loss per unit length of cable is



maximized with respect to the conductance G_1 at least over the frequency range 0.1 MHz–50 MHz.

4,687,883

METHOD FOR PRODUCING SUPERCONDUCTIVE WIRES

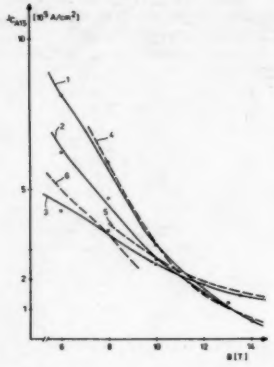
Rene Flükiger, Karlsruhe, and Stephen Gauss, Stuttgart, both of Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe GmbH, Karlsruhe, Fed. Rep. of Germany

Filed Sep. 8, 1986, Ser. No. 904,975

Claims priority, application Fed. Rep. of Germany, Sep. 6. 1985, 3531769

Int. Cl.[4] H01B *5/00*

U.S. Cl. 174—126 S **20 Claims**



1. A method for producing a superconductive wire, comprising steps for:

mixing a first powder selected from the group consisting of:

niobium;

at least one niobium alloy of Nb-Ta, Nb-Ti, or Nb-Zr;

vanadium; and

at least one vanadium alloy of V-Ta, V-Nb, V-Ti, or V-Zr with an additive comprising, at least one elemental metal powder selected from the group consisting of Ti, Zr, Hf, V, Nb, Ta, Fe, Co, and Ni, or at least one metal alloy powder-consisting of at least two of said elemental metals each powder having a grain size between about 0.1 μm and about 500 μm in diameter, to form a powder mixture, said additive comprising from about 0.1% to about 50% by weight of said powder mixture,

filling a copper or copper alloy container with said powder mixture, evacuating said container, and compacting said container and powder mixture to obtain a powder density of more than 90% T.D.,

shaping said compacted container and powder mixture into a wire having a diameter from about 0.5 mm to about 15 mm, and removing said compacted container from said wire, and

heating said wire to a temperature from about 500° C. to about 1000° C. for a period from about 48 to about 300 hours to obtain a superconductive wire.

4,687,884

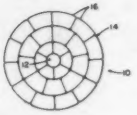
LOW DRAG CONDUCTOR

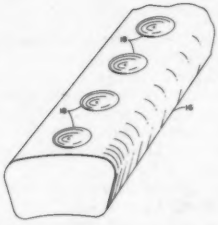
Dwain L. DeHart, Massena, N.Y., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed May 14, 1985, Ser. No. 733,957

Int. Cl.[4] H01B *5/08*

U.S. Cl. 174—130 **2 Claims**





1. A conductor for overhead transmission of electrical energy comprising:

an inner core, and

an outermost layer comprised of a plurality of conductor strands helically wound on and lengthwise of the core,

each of said strands having a generally trapezoidal shape in cross-section that provides a relatively compact cylindrical conductor structure, and outwardly facing surfaces providing with rounded discontinuous depressions spaced apart along the length of the strands,

said depressions being effective to reduce the drag of the air moving against and across the conductor by ten to fourteen percent over that of a cylindrical conductor having an outermost layer of round strands and an equivalent diameter in a range of Reynolds Numbers representing wind velocities of hurricane proportions.

4,687,885

ELECTROGRAPHIC TOUCH SENSOR WITH Z-AXIS CAPABILITY

John E. Talmage, Jr., Oak Ridge, and William A. Gibson, Knoxville, both of Tenn., assignors to Elographics, Inc., Oak Ridge, Tenn.

Filed Mar. 11, 1985, Ser. No. 710,080

Int. Cl.[4] G08C *21/00*

U.S. Cl. 178—18 **30 Claims**

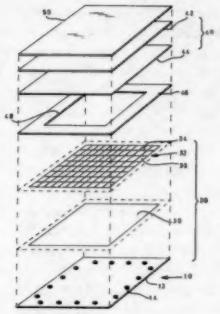
1. An electrographic touch sensor for generating signals of two-dimension coordinates of a contact point on said sensor, and having a capability of generating signals related to pressure/force applied at such point, which comprises:

a resistive sheet capable of having electrical potentials introduced therein extending across such sensor, said resistive sheet defining a perimeter and having an inner and outer surface;

a further sheet capable of having electrical potentials introduced therein positioned proximate said resistive sheet and extending across such sensor, said further sheet defin-

ing a perimeter substantially conforming to said perimeter of said resistive sheet, and having an inner surface facing said inner surface of said resistive sheet, and an outer surface, said further sheet adapted to move toward said resistive sheet upon the application of pressure/force to such sensor at a selected point;

means for generating orthogonal electrical potentials within such sensor in X and Y directions whereby signals corresponding to X- and Y-coordinates of said selected point can be produced when electrical connection is made be-



tween said resistive and further sheets at said selected point; and

enhancing means interposed between said inner surfaces of said resistive and further sheets whereby an effective contact resistance between said resistive and further sheets varies inversely with said pressure/force in a manner to differentiate between levels of pressure/force at said selected point such that said X- and Y-coordinate signals and a Z-coordinate signal can be obtained, said Z-coordinate signal being related to said pressure/force at said selected point.

4,687,886

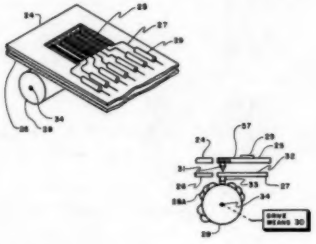
CAM ACTIVATED PRINTED CIRCUIT BOARD MULTICIRCUIT ELECTRICAL SWITCH

Helmut H. Pistor, Fairfax, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 605,960, May 1, 1984, Pat. No. 4,560,220. This application Oct. 3, 1985, Ser. No. 783,703

Int. Cl.[4] H01H *19/00*

U.S. Cl. 200—6 B **1 Claim**



1. A cam activated multicircuit electrical switch for selectively switching an electrical source to a plurality of electrical components on a multichannel printed circuit board (PCB), said multicircuit electrical switch comprised of:

an elastic PCB having a plurality of elastic PCB reeds with disattached portions at one end cutout therefrom in the generally central interior portion of said elastic PCB, each of said elastic PCB reeds having an electrical lead etched on the back thereof which leads to one of a plurality of etched electrical components on the back of said PCB and each of said elastic PCB reeds having an electrical contact pin pointing outward from the front of the disattached end portion and electrically connected through the elastic PCB reed to said etched electrical lead on the back thereof;

an electrical board made of elastic PCB-type material positioned adjacent to and slightly separated from said PCB, the elastic electrical board having a plurality of flexible reeds with disattached portions at one end cutout therefrom in the generally central interior portion of said elastic electrical board in which said plurality of flexible reeds are interfacing and matching said plurality of PCB reeds in which said disattached end portions of said flexible reeds and said PCB reeds are exactly adjacent each other and each of said flexible reeds having an electrical conductor etched on the back thereof which is electrically connected to an electrical source on said electrical board and each of said flexible reeds having an embossed mechanical rider on the front of said disattached end portion, wherein said electrical contact pin on the front disattached end portion of said PCB reed interfaces with said etched electrical conductor on the back of said disattached end portion of said flexible reed; and

a rotatable cylindrical cam switching means, said cylindrical cam switching means having an outer surface extending down the length of the front surfaces of said plurality of embossed mechanical riders on the disattached end portions of said flexible reeds, said cylindrical cam having a plurality of lobes selectively positioned thereon in which said lobes are grouped along the circumference of the cam to be associated with individual pairs of flexible reeds and the interfacing PCB reeds to define one switch of a plurality of switches formed by the plurality of paired flexible and PCB reeds such that as each lobe on said cylindrical cam is rotated by each individual paired flexible and PCB reeds the lobe rotates against said embossed mechanical rider wherein the pressure exerted on said rider biases said flexible reed disattached end portion against said electrical contact pin on said PCB reed to switch the electrical source on said electrical board through said contact pin and said electrical lead etched on the back of said PCB reed to said electrical component on the back of said PCB.

4,687,887

DUAL IN-LINE PACKAGE SLIDE SWITCH WITH DETENT ASSEMBLY

Philip T. Stokoe, N. Attleboro, Mass., and Dennis R. Boulais, Danielson, Conn., assignors to Alco Electronic Products, Inc., N. Andover, Mass.

Filed Jan. 8, 1985, Ser. No. 817,006

Int. Cl.[4] H01H *15/02*

U.S. Cl. 200—16 F **5 Claims**

1. An electrical switch comprising:

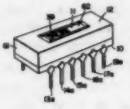
a base having pairs of electrical terminals extending downwardly from the base in a dual in-line package configuration in two parallel longitudinal rows and contact pins connecting to the terminals extending upwardly from the base in two parallel longitudinally extending rows;

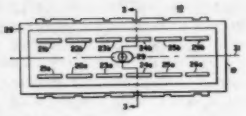
a slider longitudinally slidable in the direction of the rows and having at least one generally rectangular and vertical aperture to receive at least one contact having a plurality of laterally spaced downwardly extending contact teeth selectively to mate with and make bridging electrical connection with some of the pins upwardly extending from the base in correspondence to the longitudinal position of the slider relative to the base, the slider having on its upper surface a means for imparting sliding motion to the slider in the longitudinal direction;

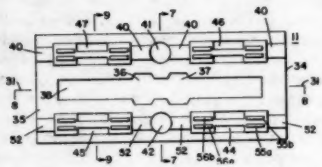
the slider having at least one recess adjacent to the generally

rectangular and vertical aperture to receive an end of the downwardly extending contact teeth;

a cover extending over the base and capturing the slider between the cover and the base, the cover having longitudinal aperture on the upper part of the cover to afford access to the sliding motion imparting means; and







the base having on its upper surface a detent, and the slider having on its bottom surface a pair of detent receiving recesses, the detent and each recess of the pair being complementary for maintaining the slider firmly in one of two selected positions.

4,687,888

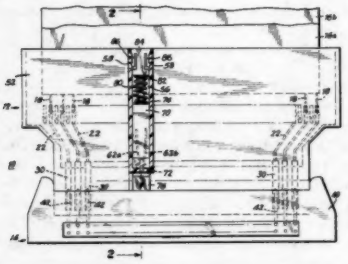
ELECTRICAL CONNECTOR WITH SWITCH

Alexander W. Hasircoglu, Lancaster, Pa., assignor to E. I. Dupont De Nemours and Co., Wilmington, Del.

Filed May 29, 1985, Ser. No. 739,033

Int. Cl.[4] H01R *33/96*

U.S. Cl. 200—51.1 **9 Claims**



1. Electrical connector apparatus comprising:

a first connector assembly having a first housing containing a plurality of first electrical terminals arrayed on a first surface of the first housing and a circuit board disposed perpendicular to said first surface, the first terminals being connected to the circuit board along a first edge of the circuit board;

a second connector assembly having a second housing containing a plurality of second electrical terminals arrayed on a second surface of the second housing so that each second terminal releasably contacts a respective one of the first terminals when the first and second surfaces are brought together;

a switch actuator member mounted and retained in the first housing for limited reciprocal motion along a first axis perpendicaular to the first surface, the actuator member including a dielectric finger extending through the first surface and being resiliently biased to move outwardly of the first housing along the first axis;

means associated with the second connector assembly for reciprocating the actuator member inwardly of the first housing along the first axis when the first and second surfaces are brought together; and

switch contact means disposed in the first housing, said switch contact means including contact members resiliently biased toward and normally in contact with one another in response to reciprocation of the actuator member in a first direction along the first axis, whereby reciprocation of the actuator member in an opposite second direction along the first axis causing said contact members to thereby break said electrical contact.

4,687,889

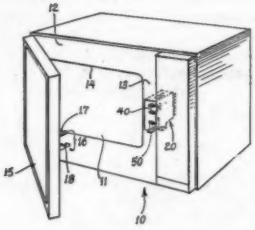
ELECTRICAL APPLIANCE INTERLOCK SWITCH WITH IMPROVED ISOLATION MEANS

Raymond A. Leger, Crystal Lake, Ill., assignor to The Cherry Corporation, Waukegan, Ill.

Filed Jul. 12, 1983, Ser. No. 512,929

Int. Cl.[4] H01H *3/16*

U.S. Cl. 200—61.62 **14 Claims**



14. An interlock switch for operating an electrical appliance in response to opening and closing of a door of the appliance, the interlock switch comprising:

a housing;

first and second conductive switch elements mounted in said housing;

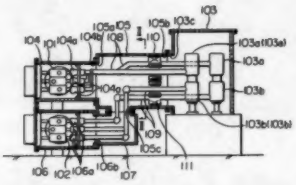
a stationary insulating barrier means comprising a contiguous isolation structure and a movable insulating barrier means for isolating said first and second conductive switch elements so that pieces broken from one of said conductive switch elements cannot come in contact with the other of said conductive switch elements; and

means for moving said movable insulating barrier means while maintaining the isolation between said first and second conductive switch elements.

4,687,890
GAS INSULATED SWITCHGEAR

Hiroshi Yamamoto; Hayato Suzuki, and Keizo Takatsuka, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 24, 1986, Ser. No. 877,864
Claims priority, application Japan, Jun. 25, 1985, 60-136887
Int. Cl.[4] H01H *33/60*
U.S. Cl. 200—148 B 12 Claims

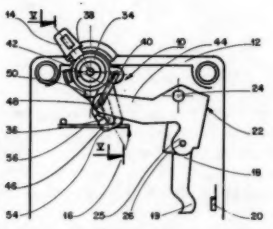


1. A bus bar connecting arrangement for a gas insulated switchgear comprising a pair of first and second bus bars disposed in a spaced apart relation with each other; first and second disconnecting switch unit connected to said first and second bus bars, respectively; a circuit interrupter provided with a single opening and including at least a pair of movable and stationary contacts for opening and closing an electrical circuit connecting between said first and second bus bars; a current transformer unit formed of at least a current transformer and adapted to be interposed between said first and second bus bars and said circuit interrupter; first connecting conductor means extending from said first bus bar into said circuit interrupter through said current transformer unit and said opening in said circuit interrupter for electrical connection between said first bus bar and said movable contact of said circuit interrupter; and second connecting conductor means extending from said second bus bar into said circuit interrupter through said current transformer unit and said opening in said circuit interrupter for electrical connection between said second bus bar and said stationary contact of said circuit interrupter.

4,687,891
FAST MANUAL CLOSING MECHANISM OF A MINIATURE CIRCUIT BREAKER

William Bartolo, Eybens; Patrick De Robertis, Vizille, and Daniel Vanzetto, Claix, all of France, assignors to Merlin Gerin, Grenoble Cedex, France

Filed Apr. 30, 1986, Ser. No. 857,624
Claims priority, application France, May 13, 1985, 85 07343
Int. Cl.[4] H01H *9/20*
U.S. Cl. 200—153 G 6 Claims



1. A fast manual closing mechanism of a moulded insulating casing electrical circuit-breaker, comprising:

a manual opening and closing operating handle having a body coupled by a kinematic linkage system to a contact arm, and being mounted pivotally on a spindle;

an energy storage spring anchored between said handle and an intermediate operating lever;

a transmission rod articulated on said operating lever so as to form a dead center toggle joint coupled with said kinematic linkage system;

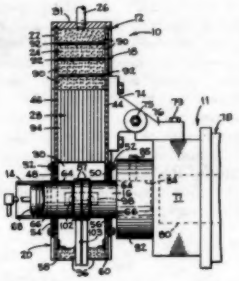
a retaining plate able to occupy either an active position for locking the transmission rod during loading of the energy storage spring, or a retracted position for unlocking the rod to free said toggle joint and allow the energy storage spring to be released; and

an unlocking pin fixed to the body of the handle in such a way as to move the retaining plate from the active position to the retractred position, when the handle reaches a predetermined point of its trajectory situated at the end of closing travel, said pin and plate forming a blocking device suitable to lock the kinematic linkage system during loading of said energy storage spring, and to free said system to bring about fast closing of the contacts of the circuit-breaker.

4,687,892
INERT ATMOSPHERE CONTROL FOR INDUCTION HEATED PRESSURE WELDING SYSTEM

Charles A. Brolin; Dennis A. Jennerjohn, and Richard E. Moeller, all of Cedar Rapids, Iowa, assignors to FMC Corporation, Chicago, Ill.

Filed Aug. 11, 1986, Ser. No. 895,085
Int. Cl.[4] B23K *13/00*
U.S. Cl. 219—8.5 24 Claims



1. An apparatus for purging air from surfaces of members to be induction heated, comprising:

means defining a hood having an inlet chamber, a flow straightening chamber, and a processing chamber therein;

means for directing an inert gas into said inlet chamber of said hood at a high volume and low pressure;

means for restricting the flow of inert gas through the inlet chamber for causing the gas to decrease in velocity and evenly fill the whole transverse cross section of said inlet chamber while providing a gradually reducing pressure gradient in the hood;

means in said flow straightening chamber for receiving the gas from said inlet chamber and for straightening the flow of gas passing therethrough for providing a laminar flow of inert gas which is directed past said weldable surfaces for quickly purging air from said surfaces; and

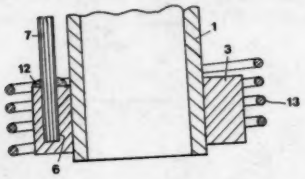
closure means for permitting the inert gas and air trained therein from discharging out of said hood while maintaining a higher gas pressure within said hood than the air pressure externally of the hood.

4,687,893

METHOD OF SOLDERING A METAL ELECTRODE TO AN ELECTRICALLY CONDUCTIVE SILICONE CARBIDE CERAMIC ELEMENT

Hilmar O. Rasmussen; Jorgen H. Petersen, both of Nordborg; Ove S. Boe, Sonderborg, and Peter J. M. Clausen, Nordborg, all of Denmark, assignors to Danfoss A/S, Nordborg, Denmark

Continuation of Ser. No. 735,582, May 20, 1985, abandoned.
This application Nov. 28, 1986, Ser. No. 936,933
Claims priority, application Fed. Rep. of Germany, May 23, 1984, 3419125
Int. Cl.[4] H05B 6/10
U.S. Cl. 219—10.41 5 Claims



1. A method of soldering a metal rod electrode to an electrically conductive silicon carbide ceramic heating element, comprising the steps of providing a bore in a silicon carbide flange of a nominal diameter about the same as that of the electrode, mounting the flange on said element, inserting the rod electrode into said bore to have part extend outwardly of the bore, then applying silicon in one of a paste and powder form on the flange in surrounding relationship to the rod electrode in an amount that upon subsequently heating and cooling will fill the gap between the bore and the electrode and will extend somewhat outwardly of the flange, partially heating the flange to melt the silicon so that the silicon penetrates into the gap between the electrode and the bore, and terminating the heating shortly after the silicon melts so that upon cooling the silicon provides a protective layer on the part of the electrode that extends into the bore and somewhat outwardly of the bore, and applying and securing a corrosion resistant protective sleeve on the part of the electrode that extends from the protective layer andoutwardly of the flange, the protective layer outwardly of the flange and the protective sleeve protecting the electrode against corrosion under high temperatures such as in a vaporization burner.

4,687,894

INDUCTION HEATING METHOD AND APPARATUS FOR RELIEVING RESIDUAL STRESS IN WELDED JOINTS IN PIPE LINE

Tadao Koga, Kisarazu; Mitsuru Sugimori, Yokohama; Masanori Terasaki, Yokohama; Tsukasa Maenosono, Yokohama; Satoru Tsushima, Yokohama; Kazuo Yoshida, Yokohama; Tetsusho Kuriwaki, Yokohama, and Miharu Hirado, Yokohama, all of Japan, assignors to Daiichi Koshuha Kogyo Kabushiki Kaisha and Ishikawajima-Harima Jukogyo Kabushiki Kaisha, both of Tokyo, Japan

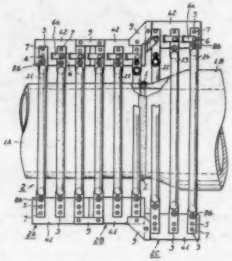
Filed May 29, 1985, Ser. No. 738,967
Int. Cl.[4] H05B 6/40
U.S. Cl. 219—10.43 3 Claims

1. A heating method for effecting residual stress relief treatment of welded joints in a pipe line comprising the steps of:

providing a plurality of induction heating coils;

selecting a plurality of individual induction heating coils each individual one of said heating coils having a shape adapted to surround a welded joint to be heated and each being split into two sections and each of said individual coils having a shape and size selected to heat that portion of pipe line located adjacent thereto to a degree necessary such that the entire area of the pipe line adjacent to the induction coils is uniformly heated, and each being supported by one of a plurality of common spacer means which spacer means can be interconnected with each other,

detachably attaching each of said individual induction heating coils to said common spacer means, moving each individual coil in situ to vary the distance between an outer surface of said welded joint and each of the individual induction heating coils as well as the individual pitches between the individual induction heating coils, and interconnecting the induction heating coils attached to said common spacer means mechanically and electrically so that the induction heating coils attached to said spacer means surround said welded joint and a portion adjacent thereto and are substantially uniformly heated to a desired temperature.

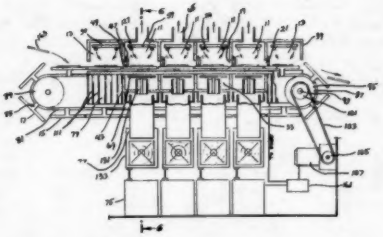


4,687,895

CONVEYORIZED MICROWAVE HEATING SYSTEM

Sanjeev R. Chitre, San Jose, and Behrooz Minaee, Campbell, both of Calif., assignors to Superwave Technology, Inc., Santa Clara, Calif.

Filed Jul. 30, 1984, Ser. No. 636,029
Int. Cl.[4] H05B 6/78
U.S. Cl. 219—10.55 A 17 Claims



1. A conveyorized heating system, comprising:

a plurality of adjacent microwave cavities;

a microwave radiating means for independently, selectively radiating microwave energy in each of said cavities;

at least one pallet means for supporting an object to be heated;

a conveyance means for transporting said at least one pallet means sequentially through said plurality of adjacent cavities;

a selectively operable, microwave and environmentally sealing closure between adjacent pairs of said cavities, closing of said closure permitting independent and arbitrarily different environmental and microwave conditions within ones of said adjacent pair of cavities; and

opening means, cooperating with said conveyance means,

for selectively and time sequentially opening said closure to permit passage therethrough of said at least one pallet means, said at least one pallet means operably integral to said conveyance means, having conveyor loop means, is made of a microwave absorptive material, said microwave absorptive pallet means directly contacts a not highly microwave absorptive object to be heated thereon which is to be heated by conduction of heat from said microwave absorptive pallet means which is heated by said radiated microwave energy as said microwave absorptive pallet means is transported through each cavity.

4,687,896

100 VOLT/220 VOLT COMPATIBLE ELECTROMAGNETIC INDUCTION HEATING COOKER

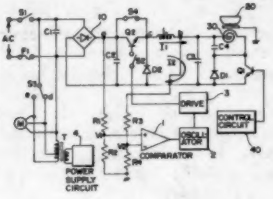
Haeng J. Baik, Seoul, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea

Filed Mar. 28, 1986, Ser. No. 845,327

Claims priority, application Rep. of Korea, Mar. 28, 1985, 2058/1985

Int. Cl.[4] H05B *6/06*

U.S. Cl. 219—10.77 **7 Claims**



1. An electomagnetic induction heating cooker compatible with a 100 volts input and a 220 volts input, comprising in combination:

an induction work coil connected in series with a choke coil;

a parallel circuit of a 100 V selecting switch and a transistor connected between an output terminal of a bridge diode and said choke coil;

a first pair of resistors connected in series to said output terminal of said bridge diode and a second pair of resistors connected in series to an output of said choke coil;

a comparator having a non-inverting input terminal connected to a connection point between said first pair of resistors and an inverting input terminal connected to a connection point between said second pair of resistors;

a series circuit of an oscillator, a driver and a 220 V selecting switch connected between an output of said comparator and a base of said transistor, said first and second pair of resistors being set so that equal voltages are applied to said non-inverting and inverting terminals of said comparator when the output voltage of said choke coil is 1/2.2 of an output voltage of said bridge diode, thereby enabling an application of a same voltage to said work coil by the proper switching of said switches when either an AC 100 V or 220 V input is applied.

4,687,897

FLAME-OFF LIMITED CIRCUIT FOR WIRE BONDING BALL FORMING APPARATUS

Frank A. McKiel, Jr., Dallas, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 24, 1986, Ser. No. 934,042

Int. Cl.[4] B23K *11/22*

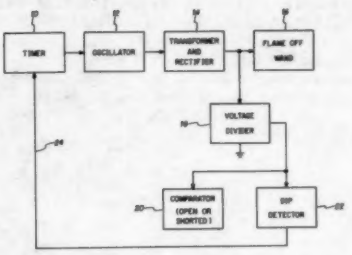
U.S. Cl. 219—56.21 **5 Claims**

4. Flame-off apparatus comprising, in combination:

timer means, including reset means and output means, for providing an output signal until receipt of a reset signal;

high voltage means, including input means connected to said output means of said timer means and output means for providing a continuously rising high voltage output signal;

flame-off wand means connected to said output means of said high voltage means; and



dip detector means, including input means connected to said output means of said high voltage means and including output means connected to said reset means of said timer means, for providing a reset signal to said timer means whenever a dip is detected in the voltage applied to said flame-off wand means.

4,687,898

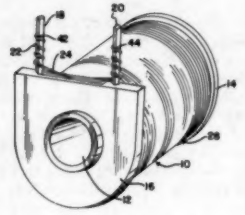
METHOD OF FUSING WIRE TO A TERMINAL

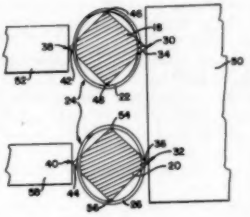
Edward D. Riordan, S. Somerville, and Allan Warner, Clark, both of N.J., assignors to Joyal Products, Inc., Linden, N.J.

Filed Dec. 13, 1985, Ser. No. 808,530

Int. Cl.[4] B23K *11/32*

U.S. Cl. 219—56.22 **12 Claims**





1. A method of attaching a piece of magnet wire to a terminal pin extending outwardly from a flange of a coil bobbin, said method including the steps of wrapping said piece of magnet wire around the terminal pin in a spiral path, recessing portions of said piece of magnet wire below an outer surface of the terminal pin, applying a pair of elecrodes to the terminal pin in the vicinity of the recessed portions of the piece of magnet wire so that said elecrodes contact said terminal pin but do not contact said piece of magnet wire and passing electric current from one electrode through the terminal pin to the other elec-

trode to thereby fuse said piece of magnet wire to the terminal pin.

4,687,899

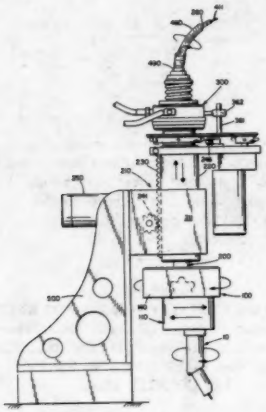
AUTOMATIC WELDING APPARATUS FOR WELD BUILD-UP AND METHOD OF ACHIEVING WELD BUILD-UP

Rees Acheson, Hill Rd., Alstead, N.H. 03602

Continuation of Ser. No. 207,341, Mar. 1, 1985, abandoned. This application Dec. 23, 1986, Ser. No. 945,182

Int. Cl.[4] B23K *9/04*

U.S. Cl. 219—76.14 **5 Claims**



1. A welding apparatus for circular welding a bore surface or an outer surface of a metallic object, said apparatus comprising a rotatable spindle, a rotatable power connector and a gas connector means operably connected to said spindle, an orbital welding torch operably connected to said spindle, a weld nozzle provided at an end of said torch, an offset adjustment means for radial adjustment of said welding torch with respect to said spindle, a wire feed means for feeding wire to said spindle, and rotating means for rotating said spindle in endless rotation; said welding apparatus being characterized in that;

(a) said wire feed means operably feeds wire to said torch through said spindle and said offset adjustment means;

(b) said rotatable power connector is provided with a gas transmission means and an electrical power transmission means for guiding gas and electrical power from external gas and electrical power sources to said rotatable spindle while leaving the spindle free for feeding of wire therethrough; and

(c) said rotatable spindle, said offset adjustment means, and said orbital welding torch are each provided with wire transmission means, gas transmission means and electrical power transmission means for guiding wire, gas and electrical power along said spindle, said offset adjustments means, and said orbital welding torch and into communication with said weld nozzle for achieving circular welding;

said rotatable power connector comprising first and second metal housings and first and second metal washers; said first housing being fixedly attached to said spindle, said second housing being provided with said gas and electrical power conduits, said first washer being fixedly attached to said first housing, said second washer being fixedly attached to said second housing, and both said second washer and said second housing being slipped over a stem of said first housing so that the second washer lies contiguous to the first washer and is held in sliding contact to said first washer by a securing means; said housings and said washers providing said rotatable power connector with electrical power transmission means and enclosures between said washers and said housings providing said rotatable power connector with said gas transmission means.

4,687,900

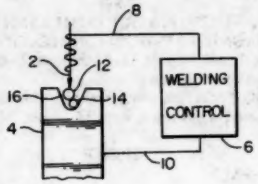
FUSING METHODS AND APPARATUS THEREFOR

Samuel Warner, Clark, N.J., assignor to Joyal Products, Inc., Linden, N.J.

Filed Jun. 12, 1985, Ser. No. 743,770

Int. Cl.[4] B23K *11/16, 11/24*

U.S. Cl. 219—111 **15 Claims**



1. A method for fusing comprising the steps of:

providing a first fusing electrode having a channel therein closely configured to admit first and second elements to be fused;

disposing first and second elements to be fused in said channel so that said first element contacts said first fusing electrode and also contacts said second element;

placing a second fusing electrode in contact with said first element under pressure;

applying a fusing current as a plurality of low voltage, high current pulses to said second fusion electrode while said second fusing electrode is in contact with said first element so that said fusing current initially passes through said first element to said first fusing electrode, and heat is generated in said first element, whereby heat is transferred from said first element to said second element, said plurality of low voltage, high current pulses being sufficient to cause intense heating of said first and second elements to occur in an area of contact of said first and second elements within said channel and for a duration which is too short for substantial heating of either of said first and second elements to occur at portions of said first and second elements remote from said channel.

4,687,901

MACHINE TOOL FOR CUTTING OR THE LIKE

Karl-Franz Binder, Ingolstädter Str. 22, and Ladislaus Czermak, Spitzwegstrasse 3, both of D-8077 Reichertshofen, Fed. Rep. of Germany

Filed Mar. 10, 1986, Ser. No. 838,275

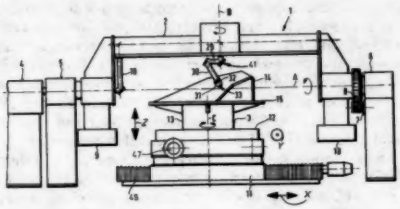
Claims priority, application Fed. Rep. of Germany, Mar. 15, 1985, 3509378

Int. Cl.[4] B23K *26/00*

U.S. Cl. 219—121 LG **10 Claims**

1. In a laser machining apparatus which can be used for cutting, trimming or the like comprising a CO_2 laser producing a laser beam and a guiding and reorienting means for directing said laser beam to a workpiece to be processed, the improvement wherein a focal point of said laser beam lies on a first rotation axis around which said guiding and reorienting means and a laser beam output member are rotatable, said laser beam output member and said focal point of said laser beam being pivotable about a second rotation axis, oriented perpendicularly to said first rotation axis, said laser beam output member describing a conical motion about said second rotation axis,

whereby said focal point and the apex of the cone described by said conical motion remains at the intersection point of said



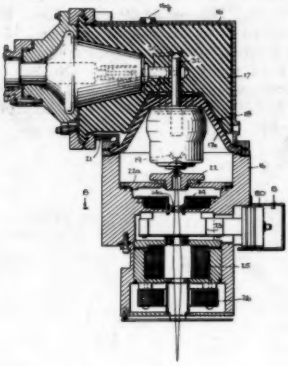
first and second rotation axes, and said workpiece is held on a mounting device movable in three dimensions.

4,687,902

ELECTRON-BEAM WELDING APPARATUS

Russell K. Colegrove, East Longmeadow, Mass., and Glen S. Lawrence, Windsorville, Conn., assignors to Leybold-Heraeus GmbH, Cologne, Fed. Rep. of Germany

Filed Aug. 6, 1985, Ser. No. 763,024
Int. Cl.[4] B23K *15/00*
U.S. Cl. 219—121 ET 10 Claims



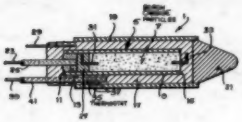
1. Electron-beam welding apparatus comprising:
an outer housing;
solid dielectric insulator means in said outer housing and having electrical conductors disposed therein and having a first liquid flow path associated therewith;
said solid dielectric insulator means including a portion of said first liquid flow path, another portion of said first liquid flow path lying between said solid dielectric insulator means and said outer housing;
a cathode connected through said conductors in said insulator means to high-voltage supply means, said first liquid flow path having a portion near said conductors for a first liquid for cooling said conductors and said insulator means, which are heated by said cathode, by flow of said first liquid in said path;
a second liquid flow path near an outer portion of said dielectric insulator means and near said first liquid flow path for a second liquid for cooling said first liquid;
an anode;
valve means for sealing said cathode and said anode in said outer housing in one position of said valve and for allowing the passage therethrough of an electron beam in another position of said valve; and
means for controlling the electron beam.

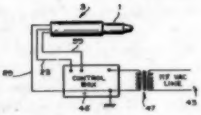
4,687,903

THERMOSTATICALLY CONTROLLED ELECTRICALLY HEATED SOLDERING BIT

Danny Zimmerman, 458 Salaberry North Boulevard, Chateauguay Quebec, Canada (J6J 4M3)

Filed Sep. 27, 1985, Ser. No. 780,889
Claims priority, application Canada, Nov. 1, 1984, 466804
Int. Cl.[4] H05B *1/02;* B23K *3/04;* H01C *8/00;* H01B *1/06*
U.S. Cl. 219—241 13 Claims





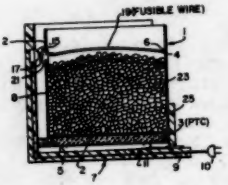
1. An electrical heating element comprising:
(a) a resistive element consisting of granular boron carbide packed in a quartz tube, said tube having one end closed by a plug of heat resistant insulating material, and another open end;
(b) a piece of copper embedding the resistive element, said piece of copper being in electrical contact with the boron carbide packed in the quartz tube at said other open end of said tube;
(c) a first power lead electrically connected to the boron carbide at the closed end of the quartz tube, said first power lead passing through, and being electrically insulated from, the insulating plug and the piece of copper, respectively; and
(d) a second power lead electrically connected to the other end of the resistive element, said second power lead being fixed to the piece of copper and electrically connected to the other end of the resistive element via said piece of copper;
whereby connection of the first and second leads to an electric power source causes the resistive element to generate heat and transmit said heat to the piece of copper in a very efficient and fast manner; and
wherein:
said first power lead is made of aluminum and is electrically insulated from the insulating plug and the piece of copper by a thick layer of aluminum oxide;
said first power lead is welded to a plug of aluminum located in the quartz tube adjacent to the insulating plug, said aluminum plug being in electrical contat with the boron carbide; and
said second powerlead is made of copper.

4,687,904

ELECTRICALLY HEATED INSECTICIDE DISPENSER

Lionel J. Melanson, Casco, Me., and Nabil Kamal, Hampton, N.H., assignors to GTE Products Corporation, Stamford, Conn.

Filed Aug. 4, 1986, Ser. No. 892,615
Int. Cl.[4] H05B 1/02
U.S. Cl. 219—271 6 Claims



1. An insecticide dispenser for a room, said dispenser comprising:

a housing and an electrically conductive, nonreuseable container disposed in said housing, said container being disposed upon a resistance heating means and adapted to receive a charge of an insecticide dispersed within a solid carrier, said charge requiring the application of heat to initiate a chemical reaction which produces the volatilization of the insecticide; and

first means connecting said container to one side of a power supply; and

second means connecting said container to the other side of said power supply, said second means including an electrically conductive fusible means, electrically connected at one end to said container and removably connected at its other end to an electrical contact disposed on said housing, said fusible means being electrically insulated from said container at all points except where it is connected to said container, whereby said fusible means can complete the circuit to the resistance heating means and initiate the chemical reaction in the charge of insecticide; and

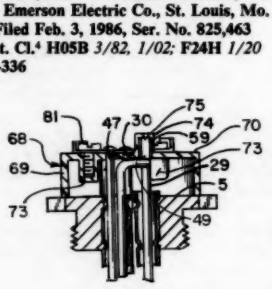
said fusible means being adapted to break at a predetermined point after said chemical reaction has been initiated whereby to discontinue the electrical heating to said charge.

4,687,905

ELECTRIC IMMERSION HEATING ELEMENT ASSEMBLY FOR USE WITH A PLASTIC WATER HEATER TANK

Donald M. Cunningham, Pittsburgh, Pa.; Mark A. Bartels, Columbus, Miss., and T. Randall Markum, Vernon, Ala., assignors to Emerson Electric Co., St. Louis, Mo.

Filed Feb. 3, 1986, Ser. No. 825,463
Int. Cl.[4] H05B 3/82, 1/02; F24H 1/20
U.S. Cl. 219—336 2 Claims



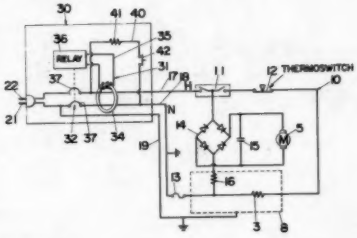
1. In a water heater with a plastic tank, a metallic sheathed electric heating element with a two-ended electric resistance element within a sheath having two generally parallel legs and a bight portion integral with and joining the inner end of said two legs, said legs being mounted in a metal plug secured in an opening in the tank wall and projecting into the interior of said plastic tank, the improvement comprising a well mounted at one end in said plug and projecting along and substantially parallel to said legs in said tank in heat exchange relation therewith, and thermal cutoff means in said well electrically connected in series with said electric resistance element, each of said electric resistance element ends having a terminal pin electrically and mechanically connected to it and projecting beyond an outer face of said plug, said thermal cut-off means having two terminals, each electrically connected to a thermal cut-off terminal pin projecting from said well and beyond said outer face of said plug, one of said thermal cut-off terminal pins being electrically and mechanically connected to one of said resistance element terminal pins at a place between the outer end of said resistance element terminal pin and said outer face of said plug, leaving a stub portion of said resistance element pin projecting beyond said place, and a cup-shaped molded non-metallic electrically insulative closure with a bottom web having two openings through it, through one of which the unconnected thermal cut-off terminal pin extends and through the other of which the unconnected resistance element terminal pin extends, said closure web having a boss with a blind hole in it into which the stub portion of said connected resistance element terminal pin projects.

4,687,906

PORTABLE ELECTRIC HAIR DRYER WITH ELECTRIC SHOCK PROTECTION CIRCUIT

Nobuichi Fujishima, Hikone; Hideharu Nakano, Ohmihachiman, and Shuhei Ochi, Hikone, all of Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed Nov. 9, 1984, Ser. No. 670,359
Claims priority, application Japan, Nov. 15, 1983, 58-215310
Int. Cl.[4] H05B 1/02; H02H 3/16; A45D 20/00
U.S. Cl. 219—364 5 Claims



1. An electrically operated portable hair dryer comprising:

an electric heater and a blower;

a pair of power feeder lines having a connecting end to be electrically connected to a source of AC power for energizing a load circuit including said heater and blower connected to the other end of the power feeder lines;

a leakage detector electrically coupled to the power feeder lines for detecting leakage current from the load circuit, said leakage detector being a zero phase-sequence current transformer electrically coupled to the power feed lines between the connecting end and the load circuit;

an electric switch disposed between said connected end and the load circuit for connecting the load circuit to the source of AC power and disconnecting it therefrom, said electric switch including means operatively connected to the leakage detector for opening said switch upon detection of the leakage current by said leakage detector; and

a heater enclosure disposed within a housing of the hair dryer for receiving therein said heater, said heater enclosure being made of an electrically conductive material and being electrically isolated from the heating element and

the one of said power feeder lines serving as a hot line so as to be electrically uncharged, and the heater enclosure being grounded by means of a grounding line electrically connected thereto so as to define with said one of said power feeder lines serving as the hot line a leakage current path extending therebetween through the medium of the water when it is immersed in the water, said grounding line connecting said heater enclosure to the other power feeder line serving as the neutral line at a point between said connecting end and the coupling portion of said power feeder lines with said zero phase-sequence transformer, thereby defining a leakage path extending through the medium of the water between the heater enclosure and the hot line of the power feeder lines when the enclosure is immersed in water.

4,687,907

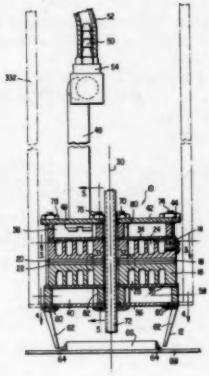
HEATER DEVICE

Vincent P. Barkley, Arlington, Va., and William J. Siegel, Silver Spring, Md., assignors to PACE, Incorporated, Laurel, Md.

Filed Jun. 7, 1985, Ser. No. 742,702

Int. Cl.[4] F24H *3/06*

U.S. Cl. 219—373 **14 Claims**



1. A heater device suitable for heating a fluid to be contacted with a plurality of terminals of a modular electronic component to facilitate attachment of said component to a substrate or removal therefrom, said heater device comprising:

heat exchange means having at least one passage extending therethrough for heating a fluid flowing through said pasasge, said heat exchange means comprising a first and second heat exchange element, each said heat exchange element having at least one passage through which fluid to be heated passes, a fluid inlet means for admitting fluid to be heated into said passage, and a fluid outlet means for passing heated fluid out of said heated passage;

heating means operatively connected to said heat exchange means for heating said heat exchange means, said heating means comprising an electrically operated stainless steel etched foil heater disposed between said first and second heat exchange elements, whereby fluid passing through said first and second elements does not come into physical contact with said foil heater, said foil heater being disposed between insulatiang layers for electrically insulating said foil heater from said first and second heat exchange elements, said foil heater being disposed so as to cover an area which substantially coresponds to an area covered by said heated passages of said first and second heat exchange elements; and

means in flow communication with said at least one passage for passing heated fluid from said at least one passage and for directing said fluid to said terminals of said component on said substrate to effect melting of solder or the like at said terminals.

4,687,908

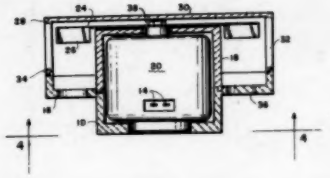
CONVECTION BLOWER FOR CONVENTIONAL ELECTRIC OVENS

Kenneth W. Thorne, Hayward, Calif., assignor to Parallel Industries, Inc., Sonoma, Calif.

Filed Dec. 23, 1985, Ser. No. 812,353

Int. Cl.[4] A21B *1/22*; F01D *1/02*

U.S. Cl. 219—400 **17 Claims**



1. A convection blower for electric ovens comprising:

a motor housing having a top, bottom and sides, said motor housing enclosing a motor having a rotatable vertically disposed shaft extending from the top of said housing;

a cylindrical blower housing enclosing a vaned blower rotor coupled to said vertically aligned motor shaft, said blower housing having a top surface and having a bottom floor surface coupled to said motor housing;

a plurality of spaced window openings in the cylindrical walls of said blower housing, at least one of said window openings being formed to divert air through the walls of said blower housing at a non-radial angle;

a plurality of spaced inlet openings in the bottom floor surface of said blower housing;

power input means for rotating said motor and said blower rotor for in drawing air through said plurality of spaced inlet openings and exhausting it through said plurality of window openings;

wherein said motor housing has cylindrical walls with an outside diameter less than the outside diameter of said blower housing and capable of being positioned on a floor of an electric oven and between the coils of a heating element therein;

wherein said cylindrical motor housing is comprised of a cylindrical lower unit for enclosing a lower portion of said motor and a cylindrical upper unit keyed to a top edge of said lower unit for easy removal therefrom, said upper unit having a top surface with a central hole for passage of the rotatable shaft of said motor;

wherein in the bottom floor of said blower housing forms a part of the cylindrical side wall of said lower motor housing unit; and

wherein for easy removal a bottom edge of said cylindrical walls of said blower housing is keyed to a periphery of said bottom floor of said blower housing.

4,687,909

APPARATUS FOR HEATING AN AIR STREAM

Walter Eichler, Steinheim; Karlheinz Färber, Giengen, and Elisabeth Fischer, Kammeltal/Behlingen, all of Fed. Rep. of Germany, assignors to Bosch-Siemens Hausgeraete GmbH, Munich, Fed. Rep. of Germany

Filed May 23, 1985, Ser. No. 737,393

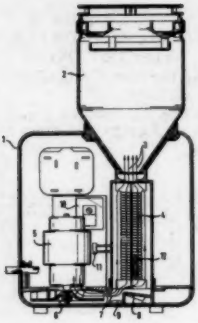
Claims priority, application Fed. Rep. of Germany, May 23, 1984, 3419267

Int. Cl.[4] B01D *15/08*

U.S. Cl. 219—502 **9 Claims**

1. Apparatus for heating an air current, comprising a heating coil being heated until it glows providing radiation in a given

region, means for conducting an air current past the heating coil, an electronic heating power control device connected to



said heating coil, and a control sensor connected to said control device in the form of a light radiation sensitive circuit element disposed in said given region.

4,687,910

CIRCUIT FOR CONTROLLING AND DISPLAYING COOKING STATES OF A RICE COOKER

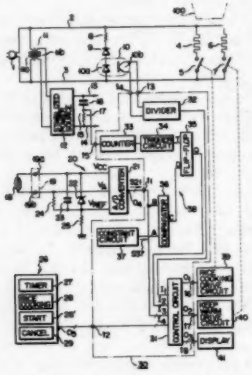
Terutaka Aoshima, Toyohashi; Morio Asahi, Gifu; Masahiro Imai, and Ryuuho Narita, both of Nagoya, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 31, 1986, Ser. No. 846,089

Claims priority, application Japan, May 10, 1985, 60-100321

Int. Cl.[4] H05B *1/02*

U.S. Cl. 219—506 **7 Claims**



1. A circuit for controlling a rice cooker having at least one heater used for heating a cooking pot, said circuit comprising:

a temperature detection element for detecting the temperature of said cooking pot;

converting means, connected so as to receive a detection signal from said temperature detection element, for converting the received detection signal to a specified electrical signal;

a connector having a pair of terminals connected in parallel between said temperature detection element and said converting means, said pair of terminals being selectively and manually short-circuited so as to bring said circuit into a model cooking operation display control state which differs from a normal cooking operation control state, wherein during said cooking operation display control state the electrical signal from said converting means has a value outside a predetermined range and during said normal cooking operation control state the electrical signal has a value within said predetermined range;

selection means, connected to receive said electrical from said converting means, for producing a first and a second selection signal when said circuit is or is not in said normal cooking operation control state, respectively;

display means for displaying a plurality of cooking operation states;

first control means for receiving said first selection signal and supplying to said heater specified turn-on control signals for dividing the cooking operation into a plurality of states and sequentially performing each cooking operation, and for supplying to said display means display control signals for dividing the cooking operation into a plurality of states corresponding to the turn-on control signals and sequentially displaying these states; and

second control means for receiving said second selection signal and supplying to said display means models display control signals for dividing said cooking operation into a plurality of states and sequentially displaying these states.

4,687,911

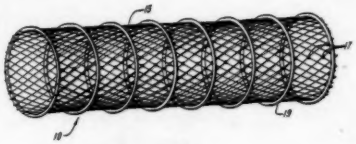
ELECTRIC FURNACE HEATER

Willard J. Lucey, Woburn, and Arthur Waugh, Winchester, both of Mass., assignors to BTU Engineering Corporation, North Billerica, Mass.

Filed Jun. 27, 1985, Ser. No. 749,573

Int. Cl.[4] H05B *3/10*

U.S. Cl. 219—553 **9 Claims**



1. An electrical heating element which is substantially self-supporting and has an adjustable heat profile along a unitary length, comprising:

a plurality of resistance wires so spaced as to form a cylinder;

at least three rings of conductive material circumferentially placed around said parallel resistance wires in such a spaced-apart relation that each pair of adjacent rings serves as mechanical support and as electrical terminals for said resistance wires therebetween;

said rings being spaced at predetermined positions to provide an intended power level for the resistance wires connected therebetween such that a temperature profile is provided along the length of the heating element as determined by said predetermined positions of said rings;

said parallel resistance wires being of sufficient gauge to form a self-supporting grate along the length of said cylinder; and

said rings being comprised of a conductive material of heavier gauge than said resistance wires.

4,687,912

BAR CODE READING METHOD AND APPARATUS

Masataka Ohta, Kanagawa, Japan, assignor to Kabushiki Kaisha Sato, Japan

Filed Jan. 2, 1986, Ser. No. 815,818

Claims priority, application Japan, Jun. 6, 1985, 60-121570

Int. Cl.[4] G06F *7/10*

U.S. Cl. 235—463 **20 Claims**

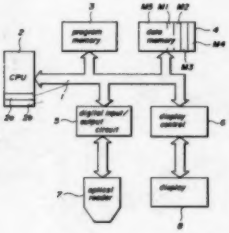
1. A method for reading a bar code which includes a sequence of printed bars and spaces either or both of the bars and

spaces having a prescribed number of different width standards associated therewith, comprising the steps of:

measuring the width of the bars and spaces and generating a respective width value for each one of the bars and spaces;

storing the width values in a memory;

calculating at least one total value which total value is obtained by summing a plurality of the width values; storing the at least one total value in the memory;



generating a respective quotient value for each one of the bars and spaces, the quotient value being a ratio between the at least one total value and the respective width value of the given bar or space;

comparing the quotient value to a predetermined reference value; and

determining which of the width standards of the bars and spaces is associated with each given bar or space based on the result of the comparison.

4,687,913

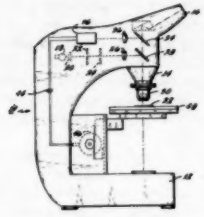
MICROSCOPE AUTOFOCUS SYSTEM

Richard J. Chaban, Ventura, Calif., assignor to Warner Lambert Technologies, Inc., Morris Plains, N.J.

Filed Nov. 25, 1985, Ser. No. 801,544

Int. Cl.[4] G01J *1/20*; G02B *21/06*

U.S. Cl. 250—201 **18 Claims**



1. An arrangement for automatically focusing a microscope being used to view an object which comprises in sequence along a single optical axis:

an illumination source providing light having a first component and a second component;

a collector;

an aperture stop;

a filter positioned at said aperture stop to confine said first component to a portion of said aperture;

a field stop;

an occluder positioned at said field stop, said occluder providing an index of said first component on one side of said optical axis and being transparent to said second component;

means for imaging said occluder on the object from where said index is transferred to the other side of said optical axis;

a microscope objective spaced from said object;

means to establish a predetermined reference for said index corresponding to a focused condition for said microscope;

means for detecting the variation of said index from said predetermined reference and generating an error signal in response to the variation; and

means associated with said detecting means for adjusting the spacing between said microscope objective and the object to minimize the error signal for focusing the microscope.

4,687,914

DISTANCE MEASURING DEVICE COMPRISING A TWO SECTIONED SENSOR, EACH SECTION HAVING A PLURALITY OF SENSING AREAS

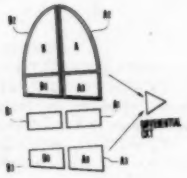
Tokuichi Tsunekawa; Yuichi Sato; Takashi Kawabata, and Susumu Matsumura, all of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha

Filed Mar. 30, 1984, Ser. No. 595,271

Claims priority, application Japan, Apr. 1, 1983, 58-57204; Apr. 1, 1983, 58-57210

Int. Cl.[4] G01J *1/20, 1/28*

U.S. Cl. 250—201 **8 Claims**



1. A device, comprising:

light projection means for projecting a detection light onto an object;

photosensing means having a first section having a plurality of sensing areas and a second section having a plurality of sensing areas arranged side by side with the sensing areas of said first section;

optical means for converging the detection light reflected by an object onto said photosensing means; and

detection means for detecting a distance on the basis of outputs of said first and second sections of said photosensing means in a first mode, and for detecting the distance on the basis of an output of a predetermined sensing area of said plurality of sensing areas of said first section and an output of a sensing area of said second section corresponding to said predetermined sensing area in a second mode.

4,687,915

AUTOMATIC FOCUSING DEVICE HAVING A HUNTING PREVENTION CIRCUIT

Shinji Sakai, Tokyo, and Takashi Kawabata, Kanagawa, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 448,742, Dec. 10, 1982, abandoned. This application Feb. 14, 1986, Ser. No. 829,792

Claims priority, application Japan, Dec. 18, 1981, 56-205787; Dec. 18, 1981, 56-205788; Dec. 18, 1981, 56-205790

Int. Cl.[4] G03B *3/10*

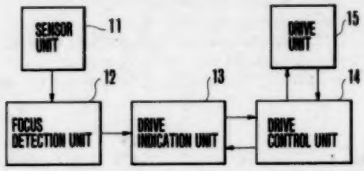
U.S. Cl. 250—201 **3 Claims**

1. An automatic focusing device, comprising:

(a) a focus detection circuit for detecting a focusing direction and a driving amount for a lens; and

(b) a lens driving circuit, said driving circuit having a first mode to drive a lens in the focusing direction detected by said detection circuit as much an amount as corresponds to the detected lens driving amount, said driving circuit also being shifted to a second mode in which the lens is driven in the detected focusing direction by a prescribed

finite amount determined by the detected lens driving amount and smaller than said driving amount when the



detected focusing direction is different from the focusing direction detected at a preceding time.

4,687,916

OPTICAL PICK-UP DEVICE FOR BOTH FOCUS AND ERROR TRACKING DETECTION

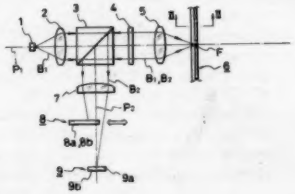
Masami Emoto, Yokohama, and Hideo Inuzuka, Kawasaki, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jul. 12, 1985, Ser. No. 754,816

Claims priority, application Japan, Jul. 13, 1984, 59-145632; Aug. 31, 1984, 59-180792

Int. Cl.⁴ G01J *1/20*

U.S. Cl. 250—201 **8 Claims**



1. An optical pick-up device comprising:

a light source for emitting light;

a first optical system for guiding said light along a first direction to impinge on an object and guiding a reflected light from said object to advance in a second direction which is different from said first direction, said first optical system including a first lens aligned with said first direction and opposite to object thereby forming a light spot thereon;

a second optical system disposed in alignment with said second direction for receiving said reflected light from said first optical system, said second optical system including a second lens which causes said reflected light to be convergent along said second direction;

tracking error detecting means having one side edge defined as a knife edge for receiving part of said reflected light;

focusing error detecting means disposed downstream of said tracking error detecting means with respect to an advancing direction of said reflected light along said second direction for receiving that portion of said reflected light which is not received by said tracking error detecting mean; and

whereby said first and second lenses have focal distances f_0 and f_1, respectively, which satisfy the condition that f_0/f_1 is equal to or larger than approximately 10.

4,687,917

FOCUS DETECTING DEVICE FOR REMOVING VIGNETTING EFFECTS

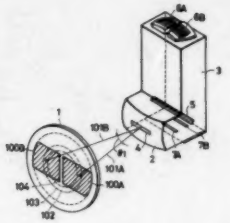
Yosuke Kusaka, and Ken Utagawa, both of Kawasaki, Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan

Filed Oct. 16, 1984, Ser. No. 661,456

Claims priority, application Japan, Oct. 19, 1983, 58-195434; Jan. 31, 1984, 59-15509; Jul. 4, 1984, 59-138809

Int. Cl.⁴ C03B *3/00*

U.S. Cl. 250—201 **15 Claims**



1. A focus detecting device for detecting a relationship between a predetermined plane and an image, which is formed by an imaging optical system, of an object to be photographed, said device comprising:

a focus detection system provided with first and second photoelectric arrays each including a plurality of photoelectric elements arranged in one direction, a detection optical system for directing a first radiation beam to said first photoelectric array and for directing a second radiation beam to said second photoelectric array and focus detection means, said first radiation beam passing through a first area of an exit pupil of said imaging optical system from said object, said second radiation beam passing through a second area of said exit pupil of said imaging optical system from said object, said second area being different from said first area, said first photoelectric array producing a first electrical signal corresponding to an intensity distribution of incident light on said plurality of photoelectric elements thereof, said second photoelectric array producing a second electrical signal corresponding to an intensity distribution of incident light on said plurality of photoelectric elements thereof, said focus detection means producing a focus detection signal representative of said relationship in response to said first and second electrical signals; and

vignetting detection means responsive to said first and second electrical signals for calculating an amount of a vignetting of said first and second light beams which is caused by said imaging optical system.

4,687,918

SAFE LASER POINTERS WITH REMOTE DIRECTIONAL ACTIVATION

John L. Hughes, and John Palmer, both of Canberra, Australia, assignors to Hughes Technology PTY LTD, Canberra, Australia

Filed May 9, 1985, Ser. No. 732,306

Int. Cl.⁴ G01J *1/32*

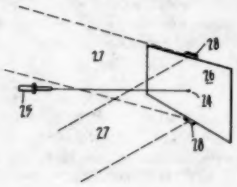
U.S. Cl. 250—205 **7 Claims**

1. A directionally activated, audience safe laser pointer system for highlighting aspects of a lecturer's presentation on a screen, said system comprising:

(a) an incoherent optical transmitter unit for mounting adjacent the screen including a curved base member, an array of pilsed light emitting diodes mounted on said curved base member for producing an optical output, a mains operated pulsed power supply coupled to said diodes and a power point unit coupled to said power supply and

adapted to be plugged directly into a main socket, said pulsed power supply exciting said light emitting diode array over selected portions of the mains frequency cycle; and

(b) a hand-held laser beam generator/transmitter unit including an optical detector disposed in a forward end of said generator/transmitter unit for receiving said optical output from said optical transmitter unit and converting said output into an electrical signal, a hollow cylindrical electrical signal amplifier for amplifying said electrical signal and mounted rearwardly of said detector, a shielded electrical cable for conducting the amplified electrical signal



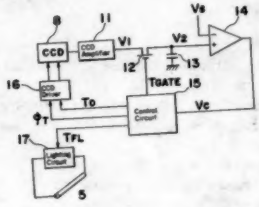
from said signal amplifier, a switch-mode laser power supply which is activated and deactivated in accordance with said amplified electrical signal from said cable, and a laser beam generator coupled to said laser power supply and disposed between said power supply and said amplifier, said laser beam generator generating a laser beam which propagates through said signal amplifier when said laser power supply is activated, whereby an output in the form of incoherent light transmitted from said transmitter unit activates said hand-held laser beam generator/transmitter unit to generate a laser beam which impinges on the screen, said laser beam being extinguished when said hand-held unit is turned away from said screen.

4,687,919

A LIGHTING CONTROL DEVICE IN MANUSCRIPT REPRODUCTION EQUIPMENT

Fumikazu Nagano, Yamatokoriyama, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jan. 30, 1985, Ser. No. 696,343
Claims priority, application Japan, Feb. 1, 1984, 59-17844
Int. Cl.[4] G01J *1/32*
U.S. Cl. 250—205 **11 Claims**



1. A lighting control device for compensating for changes in light intensity in a manuscript reproduction apparatus during a scanning period, comprising:

a back plate having a manuscript area on which a manuscript can be applied and also having a monitor area distinct from the manuscript area;

light means for illuminating the manuscript, applied to said manuscript area and said monitor area of said back plate during the scanning period;

photodetector means for detecting a brightness of light from said manuscript and light from said monitor area, said photodetector means including a charge coupled device having a plurality of elements, a first group of said plurality of elements detecting said light from said manuscript and a second group of said plurality of elements detecting said light from said monitor area; and

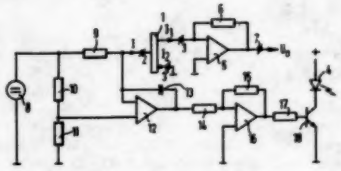
light control means for controlling a lighting time of said light means in the scanning period so as to keep the brightness of said light from said monitor area of the back plate, within a predetermined range.

4,687,920

ELECTRONIC CIRCUIT FOR DETERMINING THE POSITION OF A LIGHT SPOT ON A POSITION-SENSITIVE DETECTOR

Bernardus G. van der Linden, Zoetermeer, Netherlands, assignor to B.V. Optische Industrie "De Oude Delft", Netherlands

Filed Oct. 30, 1985, Ser. No. 792,751
Claims priority, application Netherlands, Nov. 2, 1984, 8403331
Int. Cl.[4] G01J *1/32*
U.S. Cl. 250—205 **8 Claims**



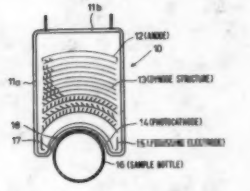
1. An electronic circuit for determining the position of a light spot produced by a light source on a position-sensitive detector having a centre terminal and two end terminals, characterized by the provision of circuitry for keeping a current applied to the centre terminal of the position-sensitive detector at a constant level, which circuitry includes means for measuring the current and means for compensating for variations in said current by controlling the luminous intensity of the light source.

4,687,921

PHOTOMULTIPLIER USED IN LIQUID SCINTILLATION COUNTING WITH SPECIMEN-ENCIRCLING CURVED PHOTOCATHODE

Hannu Kojola, Riihikoski, Finland, assignor to Wallac Oy, Finland

Filed Oct. 15, 1984, Ser. No. 661,219
Claims priority, application Finland, Oct. 28, 1983, 83 3966
Int. Cl.[4] H01J *40/14*
U.S. Cl. 250—207 **4 Claims**



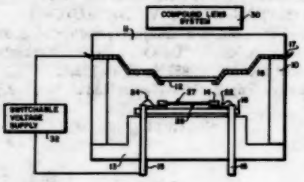
1. A photomultiplier for use in liquid scintillation counting, said photomultiplier having an envelope, a base, an anode, a dynode structure, and a measuring area formed by said envelope for accommodating a specimen in liquid scintillation counting, said photomultiplier comprising

a photocathode having a concave surface, whereby the specimen is substantially encircled by said photocathode, so that photons are impinged directly onto said photocathode.

4,687,922
IMAGE DETECTOR OPERABLE IN DAY OR NIGHT MODES

Michel G. Lemonier, and Maurice L. J. Petit, both of Paris, France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 12, 1985, Ser. No. 797,060
Claims priority, application France, Nov. 30, 1984, 84 18285
Int. Cl.[4] H01J *31/08, 40/06, 40/16;* **H01L** *25/00*
U.S. Cl. 250—213 VT **6 Claims**

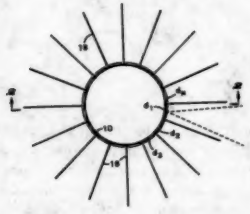


1. An image sensor device for day or night operation, said device comprising:
- an evacuated envelope having an inlet window and an outlet support;
- a semitransparent photocathode arranged inside the envelope on the inlet window, said photocathode being capable of transmitting incident photons or converting incident photons into photoelectrons;
- a detector arranged inside the envelope on the outlet support, said detector being capable of converting incident photons received through the photocathode into an electrical image signal or converting incident photoelectrons received from the photocathode into an electrical image signal;
- electronic means for focusing photoelectrons from the photocathode onto the detector, said electronic means being switchable on and off independently of the detector; and
- optical means for focusing photons on either the photocathode or on the detector;
- characterized in that:
- the photocathode consists essentially of a binary or pseudo-binary III–V material;
- the detector comprises a two-dimensional charge transfer device; and
- the electronic focusing means comprises proximity focusing means.

4,687,923
METHOD FOR DETERMINING THE DIRECTION OF A RADIATION SOURCE

Jerald L. Bauck, Urbana, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 3, 1985, Ser. No. 740,449
Int. Cl.[4] G01J *1/20*
U.S. Cl. 250—203 R **5 Claims**



1. A method of determining the bearing of a source of optical radiation comprising the steps of:

providing an optical sensor including a base member having a plurality of optical detectors mounted thereon in spaced apart relationship with each detector having an optical radiation receiving field and producing an output in response to the reception of optical radiation within the field, and further structure mounted on the base member to restrict the receiving field of each detector to a radially outwardly directed, generally conical volume having an apex at the detector;

developing a reference function from the outputs of each of the detectors;

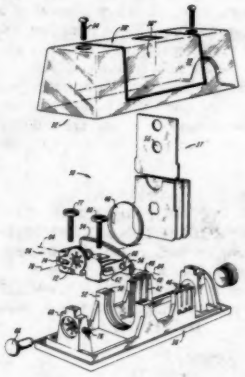
periodically developing an instantaneous function from the outputs of each of the detectors; and

comparing the instantaneous function to the reference function to determine when a change in optical radiation in the field of at least one detector occurs.

4,687,924
MODULAR TRANSCEIVER WITH ADJUSTABLE SPECULAR MEMBER

Aaron A. Galvin, Lexington; Douglas L. Mason, Newton Centre; Kenneth J. Leff, Halifax; John N. Schide, Watertown, and Ralph A. Giffone, Brighton, all of Mass., assignors to ADT Inc., Parsippany, N.J.

Filed May 8, 1985, Ser. No. 731,918
Int. Cl.[4] H01J *5/02*
U.S. Cl. 250—216 **9 Claims**



1. A modular transceiver head for a projected-beam smoke detector, comprising:
- a cover member having an infrared transparent window that subtends a preselected field of view in azimuth and in elevation;
- a base member;
- means for mounting said cover member to said base member in an air-tight sealing relation;
- an optically active element disposed on a printed circuit board;
- means including spaced walls integral with said base member having confronting slots for removeably mounting said optically active element to said base member such that said board slidably fits into and out of said confronting slots thereof;
- means coupled to said walls for releaseably retaining said printed circuit board in said slots whereby different cards selected to provide either a transmitter or a receiver function are releaseably retained in the same slots;
- an optically passive element having a focal length;
- means for mounting said optically passive element to said base member in a preselected location selected such that

said optically active element is positioned at the focal point of said optically passive element;

a specular member defining a pointing direction; and

means for mounting said specular member to said base member for a controlled movement relative to said base member in such a way that said pointing direction thereof is orientable to any selected position within said field of view of said window of said cover member;

said specular member mounting means including rough pointing direction control means for quickly and easily manually moving the specular member over comparatively large degrees of arc whereby initial pointing direction installation in the field is expedited;

said specular member mounting means including fine pointing direction control means cooperative with the rough pointing direction control means and including an azimuthal control thumbwheel and an elevational control thumbwheel and a mechanical linkage coupling said thumbwheels to said specular member cooperative with the coarse pointing direction control means to provide comparatively fine pointing adjustment of the pointing direction of the specular member in azimuth and in elevation by manually turning the corresponding azimuthal control thumbwheel and the elevational control thumbwheel.

4,687,925

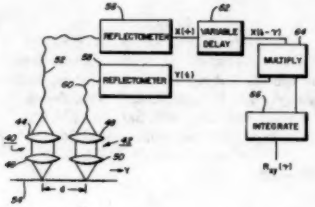
BELT SPEED MEASUREMENT USING AN OPTICAL FIBER REFLECTOMETER

Raymond W. Huggins, Mercer Island, Wash., assignor to Xerox Corporation, Stamford, Conn.

Filed Sep. 6, 1985, Ser. No. 773,154

Int. Cl.[4] G01P *3/36*

U.S. Cl. 250—223 R 7 Claims



1. A device for measuring the speed of a moving belt, the belt including molded weft fibers, comprising

a first optical reflectometer having a sense disposed adjacent to the belt for sensing a portion of the belt,

a first signal provided by said first optical reflectometer,

a second optical reflectometer having a sense head disposed adjacent to the belt for sensing said portion of the belt, the first optical reflectometer sense head being spaced from the second optical reflectometer a sense head a given distance on a line substantially parallel to the direction of movement of the belt,

a second signal provided by said second optical reflectometer,

a delay circuit for delaying said first signal,

cross correlation circuitry for determining the cross correlation function of said first and second signals, the cross correlation function including a multiplicity of peaks,

means to maximize the cross correlation function by varying the delay, and

means to divide said given distance between the reflectometers by the amount of time delay.

4,687,926

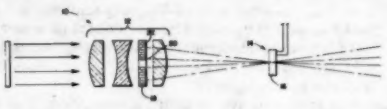
SPECTRALLY FILTERED LENS PRODUCING PLURAL F-NUMBERS WITH DIFFERENT SPECTRAL CHARACTERISTICS

William T. Plummer, Concord, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 20, 1984, Ser. No. 684,094

Int. Cl.[4] H01J *5/16;* G02B *5/22*

U.S. Cl. 250—226 23 Claims



1. Apparatus comprising:

a photoresponsive device which provides an output varying as a function of the spectral composition of radiation incident thereon;

an optical assembly structured and arranged to collect scene radiation from a given field of view and direct it onto said photoresponsive device; and,

spectral filtering means positioned substantially at an aperture stop location of said optical assembly for altering the spectral composition of radiation passing through said optical assembly into at least two spectrally filtered zones having different spectral compositions and different f/numbers and which spectral compositions are then simultaneously directed onto said photoresponsive device by said optical assembly, whereby the spectral composition of radiation reaching said photosensitive device is controlled by said spectral filtering means to effect a desired change in the output of said photoresponsive device.

4,687,927

PRESSURE MEASURING SYSTEM

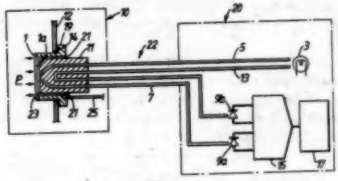
Katsuharu Iwamoto, Yokohama; Osamu Kawakami, Yokosuka; Hideo Miyagawa, Yokohama; Ikuo Tashiro, Yokohama, and Takiji Ishimura, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 23, 1985, Ser. No. 790,501

Claims priority, application Japan, Dec. 13, 1984, 59-261723; May 31, 1985, 60-116794

Int. Cl.[4] G01L *9/00*

U.S. Cl. 250—231 P 10 Claims



1. A prssure measuring system for measuring pressure, comprising:

a light source;

a first optical fiber means for transmitting a light beam from the light source;

a pressure-receiving diaphragm having a reflecting surface for reflecting light rays transmitted by the first optical fiber means, wherein said reflecting surface undergoes a deflection in relation to the pressure to be measured;

a second optical fiber means for transmitting light reflected from the pressure-receiving diaphragm;

a reference optical fiber means arranged substantially coextensive with said first and second optical fiber means for transmitting a beam from the light source in round trip fashion along substantially the same path as travelled by light transmitted by said first and second optical fiber means;

a sensor head having a first turning section for joining an end section of the first optical fiber means and an end section of the second optical fiber means with a sealed spaced in-between such that said end sections face the reflecting surface of said pressure-receiving diaphragm, said sensor head further having a second turning section for turning light transmitted by said reference optical fiber means;

a first photosensitive element for converting the reflected light transmitted by said second optical fiber means into an electrical output signal;

a second photosensitive element for converting light beam transmitted by said reference optical fiber means into an electrical output signal; and

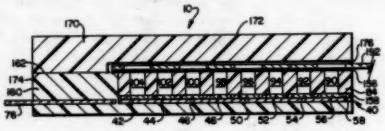
operational means for eliminating the variations in the amount of light due to external disturbances based on the electrical output signal from said first and said second photosensitive elements and for producing a corresponding output.

4,687,928

POSITION DETECTOR

Marlin O. Thurston, Columbus, Ohio, assignor to R. H. Burton Company, Grove City, Ohio

Filed Dec. 14, 1984, Ser. No. 681,925
Int. Cl.[4] G01D *5/34*
U.S. Cl. 250—231 SE **20 Claims**



1. In a position detector wherein a code carrier having pre-determined sequences of transmissive and non-transmissive areas, each sequence defining multi-bit information, is interposed between a source of radiation and a detector for determining the position of one of said code carrier or said detector, one of said detector or code carrier being moveable, the improvement which comprises:

(a) an array of radiation detectors mounted adjacent to one side of said code carrier;

(b) said source of radiation mounted adjacent said code carrier on the side opposite said radiation detector array; and

(c) a radiation guide interposed between said radiation source and said radiation detector array, said radiation guide having a plurality of discrete radiation transmissive paths each of which is in communication with only one radiation detector.

4,687,929

MONODISPERSE AEROSOL GENERATOR

Richard F. Browner, Atlanta, Ga., and Ross C. Willoughby, Wilmington, Del., assignors to Georgia Tech Research Corporation, Atlanta, Ga.

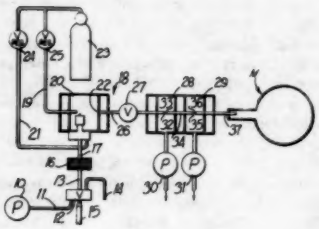
Division of Ser. No. 623,711, Jun. 22, 1984. This application Sep. 11, 1985, Ser. No. 775,035
Int. Cl.[4] B01D *59/44*
U.S. Cl. 250—282 **1 Claim**

1. A method of introducing solute recovered from effluent of a liquid chromatograph into a mass spectrometer, which comprises the steps of:

(a) generating a monodisperse aerosol of predetermined uniform droplet size from the effluent by delivering the effluent through a conduit at a velocity such that monodisperse droplet formation occurs in the absence of outside disturbances;

(b) providing a dispersing gas;

(c) dispersing the droplets with gas just after droplet formation;



(d) entraining the aerosol in qas and desolvating the aerosol at substantially atmospheric pressure;

(e) expanding the components of step (d) into a low pressure environment while removing gas therefrom to form a high momentum monodisperse aerosol beam of solute particles; and

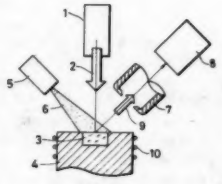
(f) directing said beam into a mass spectrometer.

4,687,930

ION BEAM APPARATUS

Hifumi Tamura, Tokyo; Shigehiko Yamamoto, Saitama; Hiroyasu Shichi, Tokyo, and Toru Ishitani, Saitama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 20, 1985, Ser. No. 736,123
Claims priority, application Japan, May 18, 1984, 59-98724
Int. Cl.[4] G01N *23/00*
U.S. Cl. 250—309 **6 Claims**



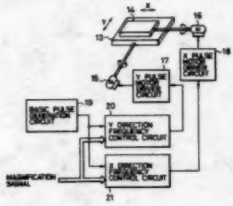
1. An ion beam apparatus for at least one of processing and analyzing a specimen comprising, ion beam generating means for generating an ion beam and for irradiating the specimen with the ion beam, and means for heating the specimen to at least a predetermined temperature above the melting point of one of an element and compound forming the ion beam, whereby the heating of the specimen to at least the predetermined temperature enables prevention of a deposition of an ion species of the ion beam on a surface of the specimen and enables high accuracy of at least one of processing and analysis of the specimen.

4,687,931

SCANNING ELECTRON MICROSCOPE

Satoru Fukuhara, Kokubunji, and Hideo Todokoro, Nitshitama, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 29, 1986, Ser. No. 857,234
Claims priority, application Japan, May 7, 1985, 60-95441
Int. Cl.[4] H01J *37/28, 37/20*
U.S. Cl. 250—310 3 Claims



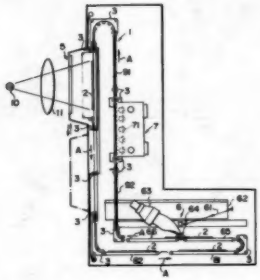
1. A scanning electron microscope comprising: electron beam focusing means for focusing and irradiating a focused electron beam on a specimen; deflecting means for two-dimensionally scanning said electron beam; detecting means for detecting a secondary electron signal generated from said specimen to form an image; moving means for two-dimensionally moving a specimen stage on which said specimen is carried; and control means making variable the two-dimensional moving speed of said specimen stage in association with the magnification of said image by controlling said moving means in accordance with an electric control signal.

4,687,932

RADIATION IMAGE RECORDING AND READ-OUT APPARATUS

Kaoru Tamura; Masao Takano, and Tsutomu Kimura, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 31, 1985, Ser. No. 739,793
Claims priority, application Japan, Jun. 1, 1984, 59-112377; Jun. 1, 1984, 59-112378; Jul. 20, 1984, 59-150996
Int. Cl.[4] G01T *1/105*
U.S. Cl. 250—327.2 10 Claims



1. A radiation image recording and read-out apparatus provided with

(i) a circulating and conveying means for conveying stimulable phosphor sheets for recording a radiation image therein along a predetermined circulation path,

(ii) an image recording section positioned on said circulation path for recording a radiation image of an object in each of said stimulable phosphor sheets by exposing said stimulable phosphor sheet to a radiation passing through said object,

(iii) an image read-out section positioned on said circulation path and provided with a stimulating ray source for emitting stimulating rays for scanning said stimulable phosphor sheet carrying said radiation image stored therein at said image recording section, and a photoelectric read-out means for detecting light emitted by said stimulable phosphor sheet scanned by said stimulating rays to obtain an electric image signal, and

(iv) an erasing section positioned on said circulation path for, prior to the next image recording in said stimulable phosphor sheet for which the image read-out has been conducted at said image read-out section, exposing said stimulable phosphor sheet to erasing light to release the radiation energy remaining in said stimulable phosphor sheet,

wherein the improvement comprises:

(v) inserting n number of said stimulable phosphor sheets onto said circulation path, wherein n denotes a natural number of 3 or more,

(vi) positioning n−2 or more waiting zones between said image recording section and said image read-out section in the advancing direction of said stimulable phosphor sheets, each of said waiting zones keeping waiting one stimulable phosphor sheet in which said radiation image has been stored, and

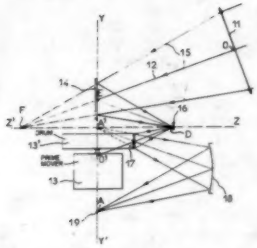
(vii) positioning n−2 or more waiting zones between said image read-out section and said image recording section in the advancing direction of said stimulable phosphor sheets, each of said waiting zones keeping waiting one stimulable phosphor sheet from which said remaining radiation energy has been released.

4,687,933

OPTICAL AND MECHANICAL SCANNING DEVICE

Fernand R. Loy, Sceaux, France, assignor to Telecommunications Radioelectriques et Telephoniques, TRT, Paris, France

Continuation-in-part of Ser. No. 654,386, Feb. 2, 1976. This application Dec. 9, 1977, Ser. No. 859,997
Claims priority, application France, Dec. 14, 1976, 76 37685; Dec. 14, 1976, 76 37686; Jan. 26, 1977, 77 02161
Int. Cl.[4] G02B *26/08, 26/10*
U.S. Cl. 250—334 43 Claims



1. Apparatus for the optical scanning of a field of vision divided into different zones and for the visual display of said field, said scanning consisting of line scanning in an x direction and raster scanning in a y direction perpendicular to said x direction, said apparatus comprising a detector and performing said scanning according to beams from different zones of said field and ensuring convergence of said beams on said detector, said detector comprising an element sensitive to the radiation contained in said beams, said apparatus further comprising in order in the direction of the path of the median incident beam emitted from said field:

an interchangeable objective having its optical axis in a plane P containing said y direction and having a curved focal

surface, the center of curvature of said focal surface being located in the center of the exit aperture of said objective;

a raster scanning mechanism including a plane raster mirror rotatable with a reciprocating motion about an axis parallel to said x direction, said mirror being located in a convergent beam behind the objective near the field image in said objective;

a beam deflection system comprising a concave field mirror having said plane P as its plane of symmetry, the vertex of which is in the vicinity of a point D on a ZZ′ axis passing through D and perpendicular to a YY′ axis, said mirror conjugating the center O of the exit aperture of said objective with a fixed point O′ on said YY′ axis, said point O′ being symmetrical with respect to the point of intersection at the ZZ′ axis of the optical axis of the objective and the YY′ axis, said mirror being drivable with a small amplitude reciprocating motion in phase with the movement of said raster scanning mechanism, said small motion correcting defocusing introduced by said raster scanning mechanism and ensuring the fixing at O′ of the center O of the exit aperture of said objective, conjugated by said field mirror, upon reciprocating rotation of said raster scanning mechanism; and

a line scanning mechanism including a drum rotatable about said axis YY′ contained in said plane P, said drum having a large number of plane reflecting faces regularly spaced about the circumference thereof, and an image transport system symmetrical with respect to said plane for forming a virtual image of said sensitive element at a fixed point A′ on the axis of rotation YY′ of said drum, said drum being placed in a convergent beam in the path of the said transport system on the side facing the image of said sensitive element, the point of symmetry of said point A′ with respect to each face of said drum being in the vicinity of point D, the point of symmetry of the focus of the objective with respect to the raster mirror in a position parallel to YY′, when said face is perpendicular to plane P, said field mirror nullifying scanning dead time between two consecutive lines having at least one width in the x direction slightly less than the length of the line analyzed and having a width equal to the distance between the images of said sensitive element in two consecutive faces of said rotating drum, said beam rotation system being delimited by the aperture in said objective toward said mechanism for line scanning the image field of said objective in the x direction.

4,687,934

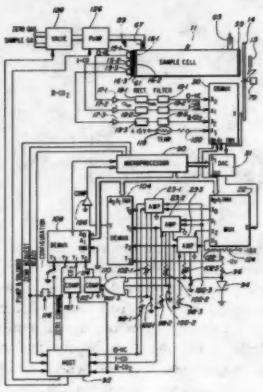
INFRARED GAS ANALYZER WITH AUTOMATIC ZERO ADJUSTMENT

Robert E. Passaro, Richmond; Raymond E. Rogers, Oakland, and Craig J. Griffith, Berkeley, all of Calif., assignors to Andros Analyzers Incorporated, Berkeley, Calif.

Filed Jan. 10, 1986, Ser. No. 818,342
Int. Cl.[4] G01J *1/00*; G01D *18/00*
U.S. Cl. 250—343 **22 Claims**

1. Automatic zeroing apparatus for zeroing an infrared gas analyzer automatically upon the occurrence of preselected conditions to indicate zero in the absence of absorption of infrared radiation by a gas mixture being analyzed, the gas analyzer having a sample cell for containing a gas mixture to be analyzed, source means for directing infrared radiation through the sample cell over a range of wavelengths, direction means responsive to infrared radiation at at least one respective preselected wavelength to produce at least one repective detection signal systematically related to the infrared radiation at the respective preselected wavelength passing through the sample cell from the source means which respective wavelength corresponds to the absorption wavelength characteristic of a respective predetermined gas, and signal processing means responsive to said at least one direction signal for indicating the relative concentration of the respective predetermined gas in the mixture being analyzed, said signal processing means including reference means for producing a reference signal, and output means responsive to said at least one detection signal and said reference signal for outputting an output signal systematically related to the difference between said at least one detection signal and said reference signal, said automatic zeroing apparatus comprising:

means for filling the sample cell with gas substantially nonabsorbent of infrared radiation at the respective characteristic wavelength,



comparator means responsive to said output signal for producing an error signal when said output signal differs from zero, and

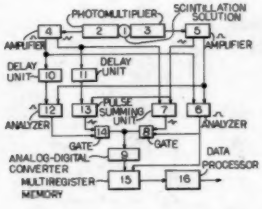
gain control means responsive to said error signal for automatically controlling the signal level of said at least one detection signal to reduce said output signal substantially to zero with said substantially nonabsorbent gas filling the sample cell.

4,687,935

LIQUID SCINTILLATION COUNTER

Jarmo Nurmi, Kuusisto; Kenneth Rundt, and Timo Oikari, both of Turku, all of Finland, assignors to Wallac Oy, Turku, Finland

Filed Oct. 1, 1985, Ser. No. 782,462
Claims priority, application Sweden, Nov. 9, 1984, 8405620
Int. Cl.[4] G01T *1/20*
U.S. Cl. 250—361 R **1 Claim**



1. In a liquid scintillation counter comprising (a) two photodetectors for viewing a scintillation solution in which both real multiphoton events and single photon events take place, (b) means for producing logic pulses and amplitude pulses in correspondence to these events, said amplitude pulses having an amplitude which is a function of the number of photons that reach said photodetectors for each and every of said multiphoton and single photon event, (c) means for adding together said amplitude pulses from said photodetectors to produce first

pulse sums, (d) means for either delaying or prolonging the amplitude pulses from one of said photodetectors, (e) means for adding together said delayed or prolonged amplitude pulses from the one of said photodetectors and undelayed amplitude pulses from the other of said photodetectors to produce second pulse sums, (f) means for delaying the logic pulses from said one photodetector, and (g) means for analyzing said delayed logic pulses and undelayed logic pulses from said other photodetector to determine whether said delayed or prolonged amplitude pulses and said undelayed amplitude pulses are coincident within a fixed coincidence resolving time, the improvement comprising an analog-to-digital converter for converting said first pulse sums to digital pulses for storage in a first multichannel analyzer in the form of a prompt coincidence spectrum and said second pulse sums to digital pulses for storage in a second multichannel analyzer in the form of a random coincidence spectrum, and means for subtracting said random spectrum from said prompt spectrum to obtain a coincidence spectrum representing multiphoton events only.

4,687,936

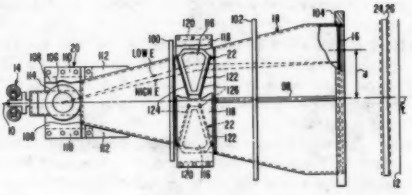
IN-LINE BEAM SCANNING SYSTEM

Raymond D. McIntyre, Los Altos Hills, and Karl L. Brown, Menlo Park, both of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.

Continuation-in-part of Ser. No. 754,033, Jul. 11, 1985, abandoned. This application Dec. 17, 1985, Ser. No. 810,398

Int. Cl.[4] G01K *1/08;* **H01J** *3/14*

U.S. Cl. 250—397 **7 Claims**



1. A system for scanning a charged-particle beam along a scan path and controlling the energy of the beam comprising:

a means for detecting a charged-particle beam pulse amplitude as the beam passes along a first line;

a means for imposing a time-varying magnetic dipole field across a charged-particles beam after the beam has passed through said means for detecting a beam pulse amplitude, whereby the beam can be deflected in a beam plane to either side of the first line;

a means for imposing a time-fixed dipole magnetic field on the beam after the beam has passed through said means for imposing a time-varying magnetic field, said means for imposing a time-fixed dipole magnetic field including means for imposing a first and a second wedge-shaped regions of magnetic field perpendicular to said beam plane, said first wedge-shaped region of magnetic field being of opposite polarity to said second wedge-shaped region of magnetic field, said first and second wedge-shaped regions of magnetic field being symmetrically positioned on either side of the first line whereby the beam direction or energy dispersion introduced at said means for imposing a time-varying magnetic dipole field is offset by focussing in said wedge-shaped regions of magnetic field;

charged-particle detector means located along the path of the beam after passing through the time-fixed magnetic dipole field; and

signal processing means for comparing a signal from said charged-particle detector means to a signal from said means for detecting a charged-particle pulse amplitude whereby the output from said signal processing means is used to control beam energy.

4,687,937

RESIDUAL IMAGE ERASURE CONTROL USING PHOTOMULTIPLIER BLEEDER RESISTOR VOLTAGE

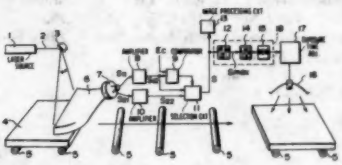
Toshitaka Aagano, and Yoshimi Takasaki, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Filed Jun. 5, 1985, Ser. No. 741,337

Claims priority, application Japan, Jun. 6, 1984, 59-116104

Int. Cl.[4] G01T *1/105*

U.S. Cl. 250—484.1 **8 Claims**



1. A method of erasing a residual image on a stimulable phosphor sheet in which a stimulable phosphor sheet capable of being repeatedly used for radiation image recording and read-out is exposed to erasing light after radiation image read-out, and the residual image caused by residual radiation energy on the stimulable phosphor sheet is erased,

the method of erasing a residual image on a stimulable phosphor sheet comprising the steps of: detecting a voltage generated at a bleeder resistor of a photomultiplier for conducting the image read-out at the step of said radiation image read-out at least for the stimulable phosphor sheet or a portion thereof where the level of X-ray exposure amount is higher than a predetermined level, and controlling the exposure amount of said erasing light on the basis of the detected voltage.

4,687,938

ION SOURCE

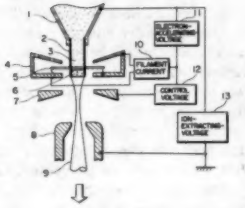
Hifumi Tamura, Hachioji, and Hiroyasu Shichi, Kokubunji, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 12, 1985, Ser. No. 808,027

Claims priority, application Japan, Dec. 17, 1984, 59-264467

Int. Cl.[4] H01J *27/00*

U.S. Cl. 250—423 F **7 Claims**



1. An ion source including ion source material holding means adapted to load an ion source material therein and having an aperture at the bottom thereof, an ion emitter mounted on said ion source material holding means at said aperture, heating means for heating said ion source material holding means and said ion emitter, an ion extracting electrode for forming a strong electric field on the surface of said ion emitter, thereby extracting an ion beam from said ion emitter, and polarity changing means for changing the polarity of an ion extracting voltage applied between said ion emitter and said ion extracting electrode, wherein said ion emitter is made

of a mixture of a material having a large work function for extracting positive ions upon application of said extracting voltage having a first polarity and a material having a small work function for extracting negative ions upon application of said extracting voltage having a second polarity.

4,687,939

METHOD AND APPARATUS FOR FORMING FILM BY ION BEAM

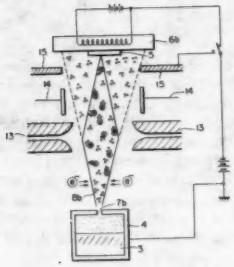
Tateoki Miyauchi, Yokohama; Hiroshi Yamaguchi, Fujisawa; Mikio Hongo, Yokohama; Katsuro Mizukoshi, Yokohama; Akira Shimase, Yokohama, and Ryohei Satoh, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 6, 1984, Ser. No. 668,843

Claims priority, application Japan, Nov. 7, 1983, 58-207433; Mar. 28, 1984, 59-58230

Int. Cl.[4] H01J *37/00*

U.S. Cl. 250—492.2 **6 Claims**



1. An ion beam apparatus comprising an enclosure defining a chamber of high vacuum, said chamber accommodating therein a furnace for producing vapor of a material contained therein, ionizing means, ion accelerating means, and an element to be deposited with said vaporized material to thereby form a film thereon, wherein an accelerating voltage is supplied across said furnace and said accelerating means such that said furnace is of positive polarity while said accelerating means is of negative polarity, said material contained in said vapor generating furnace being vaporized under heating, a pressure difference being maintained between vapor pressure within said furnace and said vacuum chamber, said furnace being provided with an opening for ejecting the vapor of said material into said vacuum chamber to thereby form atom clouds referred to as clusters under adiabatic expansion and supercooling, a part of said clusters being ionized through irradiation of an electron beam by said ionizing means and accelerated by said accelerating means so that said ionized and accelerated clusters deposit on said element to form a thin film, an electrostatic optical system interposed between the cluster ionizing region and said element to be deposited with said ionized clusters, and means for preventing contamination of the thin film formed on said element including a partition plate disposed between said element to be deposited with the ionized clusters and at least a part of said electrostatic optical system, said partition plate having an opening formed therein, wherein said electrostatic optical system serves to change a path to be followed by said ionized clusters to focus said ionized clusters at said opening of said partition plate so as to only enable said focused ionized clusters to pass through said partition plate to form an uncontaminated thin film on said element through deposition of said ionized clusters, and vapor deposition enhancing/improving means being provided in association with a deposition chamber defined by said partition plate in which said element is disposed, said vapor deposition enhancing/improving means including evacuating means connected to said deposition chamber for producing a vacuum in said deposition chamber.

4,687,940

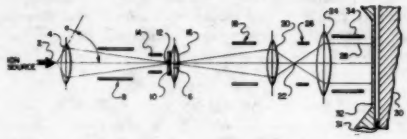
HYBRID FOCUSED-FLOOD ION BEAM SYSTEM AND METHOD

J. William Ward, Canoga Park; John L. Bartelt, Thousand Oaks; Robert L. Seliger, Agoura, all of Calif., and Charles M. McKenna, Boxford, Mass., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Mar. 20, 1986, Ser. No. 842,103

Int. Cl.[4] H01J *37/317*

U.S. Cl. 250—492.2 **23 Claims**



1. In a charged particle beam microfabrication system of the type having a means for supporting a substrate upon which an elecrical circuit is to be fabricated, a charged particle beam source, means for focusing the beam to a small spot on the substrate, and means for deflecting the spot over the substrate in a desired pattern, the improvement comprising:

means for positioning a mask in close proximity to the substrate,

a beam modification means positioned in the beam path and having a first state altering the beam collimation so that the beam substantially floods a portion of the mask, and a second state at which the focused beam is substantially unaffected, and

means for selectively switching said beam modification means between said first and second states, thereby enabling the system to be switched between rapid substrate processing in a flooded beam mode and detailed fabrication in a focused beam mode.

4,687,941

GLOVE BOX

Ingo Lasberg, Alzenau, and Wolf-Günther Druckenbrodt, Rodenbach, both of Fed. Rep. of Germany, assignors to Alkem GmbH, Hanau, Fed. Rep. of Germany

Filed Jan. 10, 1985, Ser. No. 690,155

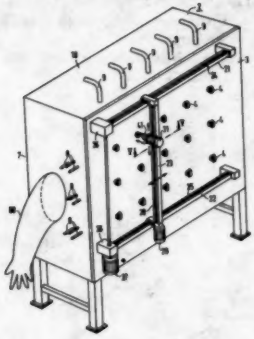
Claims priority, application Fed. Rep. of Germany, Jan. 11, 1984, 3400719

Int. Cl.[4] G21F *5/00*

U.S. Cl. 250—506.1 **6 Claims**

1. Glove box with tubular lines for harmful fluids and with shutoff valves inserted in the tubular lines and, respectively, formed of an actuating member and a valve body, comprising an exterior wall forming part of the glove box, the shutoff valves being disposed adjacent one another on said wall, the tubular lines and the valve bodies of the shutoff valves being located on the inside of said exterior wall, and the actuating members of the valve bodies being located on the outside of said exterior wall; and drive means for driving the actuating members also located on the outside of said exterior wall and having a device for docking with the respective actuating members, a pair of parallel rectilinear guide rails mounted on the outside of said exterior wall, another rectilinear guide rail formed as a slider extending perpendicularly to and being slidable on and alongsaid pair of parallel guide rails, said drive means, in turn, being slidable on and along said other rectilin-

ear guide, said drive means being thereby guidably displaceable in a plane parallel to said exterior wall to the respective



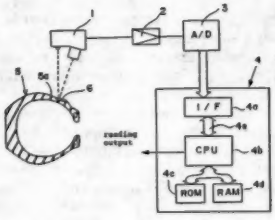
actuating members for docking with the respective actuating members.

4,687,942

METHOD OF READING CONCAVO-CONVEX BAR CODE

Haruyuki Takagi, Fujisawa, and Takeshi Yonezawa, Hiratsuka, both of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan

Filed Apr. 24, 1985, Ser. No. 726,787
Claims priority, application Japan, Nov. 29, 1984, 59-250524
Int. Cl.[4] G06K *5/00*; G01N *21/86*
U.S. Cl. 250—556 **1 Claim**



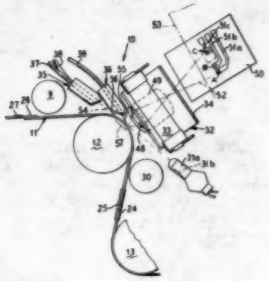
1. A method for reading a raised bar code having a plurality of thick and thin bars comprising scanning the bar code with a displacement sensor to produce a waveform of the bar code, determining the maximum value and the minimum value of the waveform within a first given unit of time and calculating a center value H_m thereof, repeating the calculation for a plurality of time units that shift sequentially along the waveform by a pitch less than the time unit and plotting the center values obtained, casting off the portions of the waveform below the plot of H_m and producing a shaped waveform therefrom having a predetermined upper limit value L, determiming the areas of the resulting waveform portions between H_m and L and then comparing the areas thus obtained with reference areas of the thick and thin bars of the bar code to determine the pattern of the bar code.

4,687,943

OPTICAL MOTION PICTURE FILM INSPECTION SYSTEM

Howard Bowen, Northbrook; David Henderson, Mundelein, and Carl Olson, Vernon Hills, all of Ill., assignors to Research Technology International, Lincolnwood, Ill.

Filed Jan. 18, 1985, Ser. No. 692,845
Int. Cl.[4] G01N *21/01*; G06K *7/10, 7/14*
U.S. Cl. 250—570 **21 Claims**



1. A method for analyzing motion picture film for flaws at an inspection station which has associated film flaw detection electronics, comprising the steps of:

in the entire station providing a single curved inspection region;

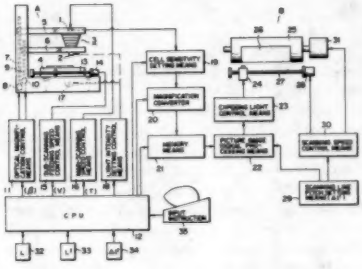
at said single inspection region using light radiated on the inspection region and associated optical detectors in providing all film flaws detection operations including film thickness, sprocket hole defects, and sound track side edge defects at said single curved inspection region and without physical contact by the optical detectors with a surface of the film.

4,687,944

METHOD FOR CONTROLLING MAGNIFICATION VARIATION

Ikuo Mitsuka, and Akira Kuwabara, both of Kusatsu, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan

Filed Jul. 30, 1985, Ser. No. 760,751
Claims priority, application Japan, Aug. 29, 1984, 59-178286
Int. Cl.[4] H04N *1/024*
U.S. Cl. 250—578 **7 Claims**



1. A method for controlling magnification variation comprising the steps of:

projecting a picture image of an original on a light receiving surface of a line sensor by an optical means;

moving said picture image projected on the light receiving surface of the line sensor in a speed-variable main scanning

direction which intersects at right angles with a speed-variable sub-scanning direction in which said sensor is aligned at right angles by a feeding means; and

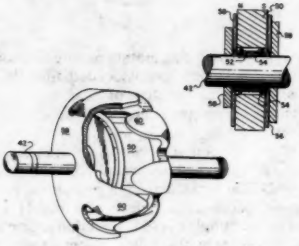
controlling the variable feeding speed in both the main direction and the sub-scanning direction and controlling an electric charge storage time of said line sensor so that a reproduced picture image of a desired magnification variation may be obtained.

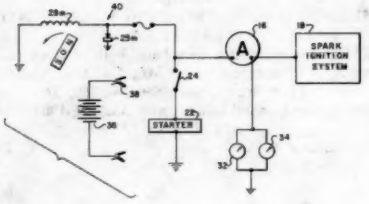
4,687,945

LOW POWER GENERATOR

Donald C. Ebeling, Plainview, Tex., assignor to Loyd Lowery and Joyce Lowery, both of Lubbock, Tex.

Filed Mar. 13, 1985, Ser. No. 711,595
Int. Cl.[4] A02K *21/22*
U.S. Cl. 290—37 R **3 Claims**





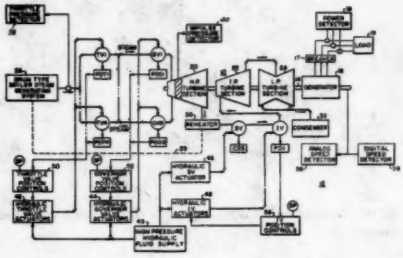
1. A magnetic rotor for an electrical generator including
a. a stator with
b. stator windings connected to
c. diode rectifiers,
d. said rotor including
e. a shaft journaled to the stator, and
f. two clam shell pole pieces on the shaft;
g. wherein said improved structure comprises in combination with the above:
h. a disc shaped magnet having two radial faces with a centrally located hole
i. coaxial with the shaft
j. between said clam shell pole pieces, with
k. a washer pole piece between each radial face of the magnet and the clam pole piece,
l. a synthetic plastic bushing snugly on the shaft,
m. said disc magnet around the bushing, and
n. two "O" rings between the bushing and disc magnet.

4,687,946

SYSTEM AND METHOD FOR OPERATING A STEAM TURBINE WITH DIGITAL COMPUTER CONTROL AND WITH IMPROVED MONITORING

Donald J. Jones, Pittsburgh, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 26, 1972, Ser. No. 247,600
Int. Cl.[4] F01D *19/00*
U.S. Cl. 290—40 R **13 Claims**



1. An electric power generating system having a steam turbine powered by a steam generator, and adapted to drive an electric generator, said system comprising:
a. means for digitally computing speed control signals through a startup range extending from a predetermined speed to synchronous speed, having a central processor unit and a memory interconnected with said central processing unit;
b. means for converting input signals to digital data, and for transmitting said digital data to said digital computing means throughout said startup range;
c. means for converting digital data to output signals, said digital to output converting means connected to said digital computing means and adapted to transmit said output signals throughout said startup range;
d. means for sensing the magnitude of predetermined turbine operating parameters and for generating input signals representative of said parameters, said sensing means being connected to said input converting means;
e. means for controlling the steam flow to said turbine;
f. said output signal converting means connected to said steam flow control means;
g. means for sensing predetermined turbine startup conditions and for connecting startup condition status signals to said digital computing means;
h. said digital computer means being characterized in that it is programmed to compute said speed control signals as a function of at least one of said input signals for controlling said steam flow control means, and to monitor said predetermined startup condition signals and interrupt the computing of said control signals when predetermined changes of said startup conditions are monitored;
i. said computed control signals being converted to output signals by said output converting means for controlling said steam flow control means.

4,687,947

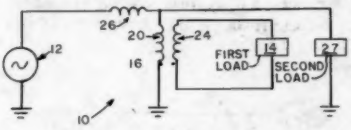
ELECTRICAL POWER CONSERVATION CIRCUIT

Melvin Cobb, 239 E. 69th Way, North Long Beach, Calif. 90805

Filed Feb. 8, 1985, Ser. No. 699,807
Int. Cl.[4] H01F *33/00*
U.S. Cl. 307—17 **6 Claims**

1. An electrical power conservation circuit for use with an alternating current power supply and first and second loads comprising a load isolating transformer having a magnetically permeable core, a separate primary winding connected to said power supply and wound on said core to produce magnetic flux in a first direction in said core, a secondary winding sepa-

rate and isolated from said primary winding connected to said first load and wound on said core to produce magnetic flux in said same first direction in said core, and a return winding



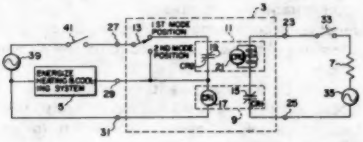
connected to said second load and wound on said core to produce magnetic flux in a direction opposite to said first direction.

4,687,948

DUAL MODE CONTROLLER FOR ASSIGNING OPERATING PRIORITY OF TWO LOADS

Robert W. Helt, Tyler, Tex., assignor to American Standard Inc., New York, N.Y.

Filed Mar. 21, 1986, Ser. No. 842,585
Int. Cl.[4] H02J *1/00*
U.S. Cl. 307—38 **19 Claims**



1. A dual mode controller used to allow only one of a first and a second load to operate at a time and used to select which load is given priority over the other to operate, comprising:

a. a switch having a first and a second position;

b. sensing means for determining which of said first and second loads is operating; and

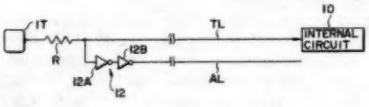
c. contact means, responsive to said sensing means and said switch, for allowing only one load to operate at one time with said first load given priority when said switch is in said second position, and when said switch is in said first position, preventing one load from turning on when the other load is operating.

4,687,949

SIGNAL TRANSMISSION CIRCUIT IN A SEMICONDUCTOR INTEGRATED CIRCUIT

Hiroshi Yasuda, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 5, 1985, Ser. No. 795,256
Claims priority, application Japan, Nov. 14, 1984, 59-240208
Int. Cl.[4] H03K *17/56, 5/13, 5/159, 17/28*
U.S. Cl. 307—246 **7 Claims**



1. A signal transmission circuit comprising:

a signal transmission line having a first stray capacitance formed on a semiconductor integrated circuit chip;

an auxiliary line capacitively coupled with said transmission line and having a second stray capacitance; and

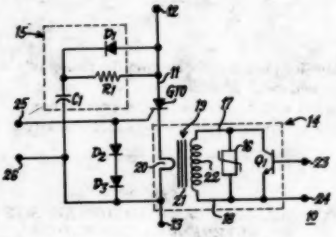
signal supplying means for supplying a first input signal having a first rate of change to said transmission line, and for supplying, to the input end of said auxiliary line, a second input signal controlled by said first signal and including means so that said second signal rises or falls together with said first signal but at a second, faster, rate of change as compared to said first rate of change.

4,687,950

THYRISTOR COMMUTATION CIRCUIT

Edward K. Howell, Simsbury, Conn., assignor to General Electric Company, New York, N.Y.

Filed Mar. 14, 1986, Ser. No. 839,400
Int. Cl.[4] H03K *17/72*
U.S. Cl. 307—642 **8 Claims**



1. A thyristor switch circuit comprising:

(a) a thyristor having anode, cathode and gate electrodes, said anode and cathode electrodes being connected in a power circuit with a source of potential;

(b) a commutation circuit for increasing the impedance of said power circuit and causing thyristor current to transfer to said gate electrode and terminating conduction between said cathode and anode electrodes;

(c) said commutation circuit comprising a current transformer having a primary and a secondary winding and a transistor having primary electrodes and at least one control electrode;

(d) said primary winding being connected in series circuit with said cathode electrode and said source;

(e) said secondary winding being connected in series circuit with the primary electrodes of said transistor;

(f) means for applying a signal to at least one control electrode and one of the primary electrodes of said transistor to switch said transistor and thus the thyristor between their conducting and turn off states; and

(g) a snubber circuit connected in parallel with the series combination of said thyristor and the primary winding of said transformer for receiving circuit current from said thyristor when said thyristor is turned off.

4,687,951

FUSE LINK FOR VARYING CHIP OPERATING PARAMETERS

David J. McElroy, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

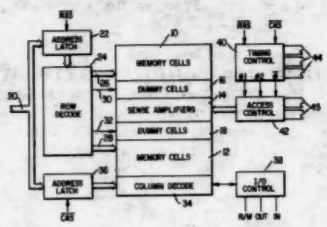
Filed Oct. 29, 1984, Ser. No. 666,013
Int. Cl.[4] H03K *5/13, 5/00, 5/159;* **H01L** *9/02*
U.S. Cl. 307—269 **19 Claims**

1. A circuit with permanently adjustable operating parameters, comprising:

a functional circuit block having a plurality of discrete circuits contained therein, said discrete circuits interfaced in a predetermined manner to perform a desired function according to operating parameters associated with said functional circuit block, said operating parameters including parameters responsive to the timing of clock control signals;

control means for generating a plurality of clock control signals of varied timing for controlling the timing of oper-

ation of said discrete circuits to effect the performance of said desired function with said plurality of discrete circuits in said functional circuit block; and



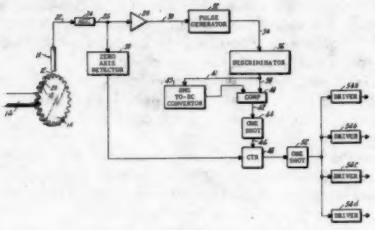
means for permanently altering the timing of a selected one of said clock control signals within said control means to effect a change in the time of operation of at least one of said discrete circuits of said functional circuit block.

4,687,952

DYNAMIC ANGULAR POSITION SENSOR FOR A REFERENCE GEAR TOOTH

Anthony Capizzi, Jr., Columbia, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Feb. 6, 1984, Ser. No. 577,474
Int. Cl.[4] H03K *5/00, 5/26;* **G01B** *7/14;* **G08B** *21/00*
U.S. Cl. 307—261 **2 Claims**



1. A circuit for use with a gear having a plurality of constant height teeth therein, one tip of which has been shaved to act as a reference tooth, comprising:

transducer means including a head positioned adjacent said rotating gear for providing a sinusoidal signal related to the passage of each tooth by said head;

gain control means connected to said transducer means for providing an output signal comprising said sinusoidal signal with the peak-to-peak amplitude limited to a predetermined range;

pulse generator means for receiving said output signal and providing a spike output signal when the amplitude of said output signal exceeds a preset level;

comparator means connected to said pulse generator means for providing a reference pulse for each revolution of said gear, said reference pulse being indicative of the angular position of said reference tooth.

first one shot means for receiving the output of said comparator means to produce a reference pulse of a predetermined length;

a counter means that is enabled by said reference pulse from said first one shot means; and

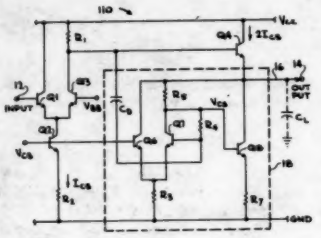
a zero axis detector means for detecting the transition points of said sinusoidal signal to provide a clocking output signal to clock the counter.

4,687,953

DYNAMIC ECL LINE DRIVER CIRCUIT

Hemmige D. Varadarajan, Sunnyvale, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Apr. 18, 1986, Ser. No. 853,504
Int. Cl.[4] H03K *19/086, 17/04, 19/01, 19/013*
U.S. Cl. 307—270 **8 Claims**



1. An ECL line driver circuit for driving line loads having significant capacitance comprising:

an input transistor having its collector coupled to a supply potential and its base connected to receive an input logic signal;

a reference transistor having its collector connected to the supply potential via a load resistor, its base connected to a bias voltage, and its emitter connected to the emitter of said input transistor;

a main current source transistor having its collector connected to the common emitters of said input transistor and said reference transistor, its base connected to a reference voltage, and its emitter connected to a ground potential via an emitter resistor;

an emitter follower transistor having its collector connected to the supply potential, its base connected to the collector of either said input or reference transistor, and its emitter connected to an output terminal;

buffer means formed of a first transistor and a second transistor for amplifying and inverting a transient voltage at the collector of said input or reference transistor, said first transistor having its collector connected to the emitter of said emitter follower transistor, its base connected to the reference voltage and its emitter connected to the emitter of said second transistor, said second transistor having its collector connected to a first end of a first resistor and its base connected to a first end of a second resistor, the second end of said second resistor being connected to the first end of said first resistor, the second end of said first resistor being connected to the emitter of said emitter follower transistor, the common emitters of said first and second transistors being connected to the ground potential via a third resistor;

a current source enhancement transistor having its collector connected to the emitter of said emitter follower transistor and to the output terminal, its base connected to said second end of said second resistor and its emitter connected to the ground potential via a fourth resistor; and

a capacitor having its one end connected to the collector of said input or reference transistor and its other end connected to the base of said second transistor of said buffer means whereby the transient voltage is impressed upon said base of said current source enhancement transistor during logic level transitions at the base of the emitter follower transistor to speed up said transitions on said output terminal.

4,687,954

CMOS HYSTERESIS CIRCUIT WITH ENABLE SWITCH OR NATURAL TRANSISTOR

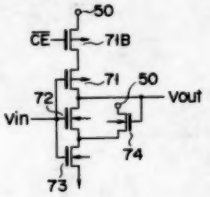
Hiroshi Yasuda, Tokyo; Kiyofumi Ochii, and Fujio Masuoka, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 5, 1985, Ser. No. 708,508

Claims priority, application Japan, Mar. 6, 1984, 59-42753; Mar. 6, 1984, 59-42754; Mar. 31, 1984, 59-63581

Int. Cl.[4] H03K *3/356*

U.S. Cl. 307—279 **7 Claims**



1. A transistor circuit for a semiconductor device with hysteresis operation, comprising:

first, second, and third power supply lines;

detector means for detecting a change in the level of an input signal according to one of a first threshold level and a second threshold level different from said first threshold level and for generating an output signal having a level corresponding to said input signal, the level of said input signal being changed between a first level and a second level that is different from said first level, and said first and second threshold levels falling within a range defined between said first and second levels, said detector means including a first transistor having a source coupled to said first power supply line, a gate coupled to receive said input signal, and a drain providing said output signal, and a second transistor having a drain coupled to said drain of said first transistor, a gate coupled to receive said input signal, and a source responsive to a given potential for determining which of said first and second threshold levels is to be applied to said detector means; and

selector means coupled to said detector means for selecting one of said first and second threshold levels in accordance with the level of said output signal and applying the selected one threshold level to said detector means, said selector means including a third transistor having a drain coupled to said source of said second transistor, a gate coupled to receive said input signal, and a source coupled to said second power supply line, and a fourth transistor having a drain coupled to said third power supply line, a gate coupled to receive said output signal, and a source providing said given potential, said detector means further including a switch element coupled in series to said first, second, and third transistors and being responsive to a given signal, for cutting-off a current path formed between said first power supply line and one of said second or third power supply lines in accordance with the logical level of said given signal.

4,687,955

SCHMITT CIRCUIT WITH MIS FIELD EFFECT TRANSISTORS

Hiroyuki Koinuma, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 26, 1986, Ser. No. 912,006

Claims priority, application Japan, Sep. 30, 1985, 60-214545

Int. Cl.[4] H03K *3/29, 3/26, 5/153, 19/017*

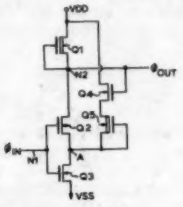
U.S. Cl. 307—290 **5 Claims**

1. A Schmitt circuit comprising:

a first transistor of depletion type, in which the drain is connected to a first power source and the gate and the source are connected to each other;

second and third transistors of enhancement type are connected in series between the node where the gate and the source of the first transistor are connected together and a second power source, and the gates of the second and third transistors are connected to each other;

a fourth transistor of enhancement type, in which the drain is connected to the first power source and the gate is connected to the node where the gate and source of the first transistor are connected together;



a fifth transistor of depletion type, in which the drain is connected to the source of the fourth transistor and the gate and the source are connected together and are connected to the node where the source of the second transistor and the drain of the third transistor are connected together;

an input terminal inputted an input signal at the node where the gates of the second and third transistors are connected together; and

an output terminal outputting an output signal from the node where the gate and source of the first transistor are connected together.

4,687,956

LIQUID CRYSTAL ELEMENT DRIVING APPARATUS

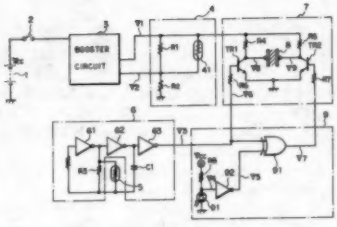
Hiroshi Itoh; Yasutoshi Suzuki, both of Oobu; Tsuyoshi Fukada, Nagoya; Shinya Ohmi, Anjo, and Kunihiko Hara, Nukata, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Nov. 9, 1984, Ser. No. 670,015

Claims priority, application Japan, Nov. 14, 1983, 58-213624

Int. Cl.[4] G02F *1/13;* **G09G** *3/36, 3/18;* **H03K** *3/26*

U.S. Cl. 307—310 **12 Claims**



1. An apparatus for driving a liquid crystal element, mounted on a vehicle, comprising:

a feedback control type voltage booster circuit, for connecting to a battery of said vehicle, for producing an output voltage that can be greater than the voltage of said battery said output voltage being a function of a control voltage applied to said voltage booster circuit;

a thermistor having a predetermined temperature resistance characteristic for sensing the temperature of said liquid crystal element by changing its resistance value according

to said predetermined temperature-resistance characteristic;

a voltage divider circuit including said thermistor as a component thereof for dividing said output voltage from said booster circuit to produce said control voltage which is coupled to said booster circuit, said voltage divider circuit being so formed as to decrease a change of said control voltage relative to a change in the resistance value of said thermistor so that the output voltage of said booster circuit is increased more sharply as the sensed temperature becomes low, thus providing a booster circuit output voltage that is a non-linear function of temperature; and

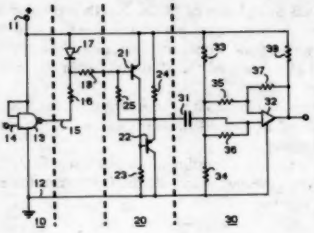
a driving circuit for driving said liquid crystal element with said booster circuit output voltage.

4,687,957

FIBER OPTIC TRANSCEIVER

Vernon P. O'Neil, II, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 23, 1982, Ser. No. 371,141
Int. Cl.[4] H03K *3/42*; G06G *7/12*; H01L *31/14*
U.S. Cl. 307—311 **7 Claims**



1. An optical transceiver circuit comprising:

a single light emitting diode;

a driver coupled to said diode for causing a drive current to flow discontinuously through said diode, said diode emitting light in response to said drive current; and

a sense circuit coupled to said diode for detecting current generated by said diode when said drive current is not flowing through said diode and light is incident upon said diode.

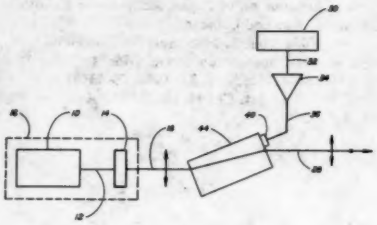
4,687,958

APPARATUS TO TRANSFORM A SINGLE FREQUENCY, LINEARLY POLARIZED LASER BEAM INTO A HIGH EFFICIENCY BEAM WITH TWO, ORTHOGONALLY POLARIZED FREQUENCIES

Gary E. Sommargren, Madison, Conn., assignor to Zygo Corporation, Middlefield, Conn.

Filed Mar. 12, 1985, Ser. No. 710,927
Int. Cl.[4] G02F *1/35*
U.S. Cl. 307—425 **27 Claims**

1. An electro-optical apparatus comprising a light source for providing a linearly polarized single stabilized first frequency optical input beam having an associated intensity; means for providing a second frequency stabilized electrical signal; and means connected to both said input beam providing means and said electrical signal providing means for transforming said input beam into an output beam having two collinear orthogonally polarized output beam components different in frequency from each other by the frequency of said second frequency stabilized electrical signal while each containing substantially one half of said input beam associated intensity; whereby said output beam has substantially 100% of said input beam associated intensity for providing nominally a 100% efficiency for said electro-optical apparatus.

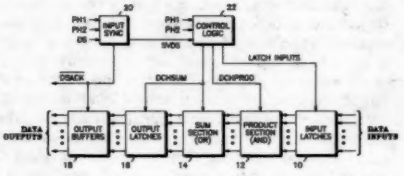


4,687,959

METHOD AND APPARATUS FOR ACCESS TO A PLA

John K. Eitrheim, Cedar Park, and Ashok H. Someshwar, Austin, both of Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 27, 1986, Ser. No. 845,283
Int. Cl.[4] H03K *19/096*
U.S. Cl. 307—465 **18 Claims**



1. A programmable logic array having a plurality of inputs and a plurality of outputs comprising:

a plurality of input latches coupled to said plurality of inputs;

a first logic section having inputs coupled to said input latches;

a second logic section having inputs coupled to outputs of said first logic section and having outputs coupled to said plurality of outputs; and

control means for receiving at least one clock signal and a strobe signal and for producing a latch input signal to operate said plurality of input latches, a first discharge signal to operate said first logic section and a second discharge signal to operate said second logic section, said latch inputs signal being asserted and negated continuously in synchrony with said at least one clock signal except when said strobe signal is active, said first discharge signal being asserted and negated continuously in synchrony with said at least one clock signal except when said strobe signal is active and said second discharge signal being asserted and negated in response to said strobe signal.

4,687,960

METHOD AND APPARATUS TO REDUCE OPERATING NOISE OF DYNAMO ELECTRIC MACHINES, PARTICULARLY VEHICULAR THREE-PHASE ALTERNATORS

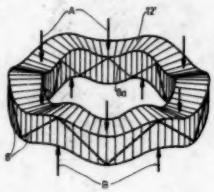
Manfred Frister, Schwieberdingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Apr. 4, 1986, Ser. No. 848,406

Claims priority, application Fed. Rep. of Germany, May 14, 1985, 3517330

Int. Cl.[4] H02K *15/02*

U.S. Cl. 310—42 22 Claims



1. In a method of manufacturing a dynamo electric machine, having a housing (1, 9, 5, 10) and a stator formed of a stack of ring laminations (12, 12', 12") retained in the housing,

comprising the step of assembling the stator laminations in a stack to provide a stator stack defining a stack axis, an inner circumferential stack surface, and an outer circumferential stack surface.

a method of reducing operating noise of the dynamo electric machine further comprising the step of

stabilizing the laminations in the stack of laminations (12, 12', 12") with respect to varying magnetic forces acting thereon and which forces arise in operation of the machine,

said stabilizing step including placing at least one circumferentially extending and axially undulating endless welding seam or track on the edges of the laminations forming one of said stator circumferential stack surfaces.

4,687,961

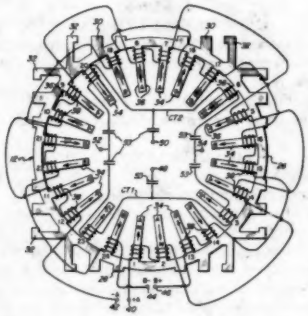
POLYPHASE DC MOTOR WITH SENSOR POLES

Ralph W. Horber, Marshfield, Mass., assignor to Seiberco Incorporated, Braintree, Mass.

Filed Mar. 17, 1986, Ser. No. 840,008

Int. Cl.[4] H02K *3/16;* H02P *6/02*

U.S. Cl. 310—186 25 Claims



1. A polyphase, direct current electric motor, or the like, comprising: a stator of magnetic material comprising a generally cylindrical body portion and a multiplicity of identical pole elements extending radially from said body portion at locations spaced thereabout, and a corresponding multiplicity of coils wound about said pole elements; sensor means having at least two electrical circuit legs, one of said circuit legs being connected to said coils on a first pair of said pole elements and the other of said two circuit legs being connected to said coils on a second pair of said pole elements, said pole elements of said first pair being disposed on said body portion in a non-interposed relationship with said pole elements of said second pair, said sensor means-connected coils adapting the associated pole elements to function in pairs as sensor poles, providing at least two sensor channels for the generation of signals indicative of the angular orientation of a rotor assembled with said stator; and power supply means for providing at least two phases of current, said supply means having one circuit portion connecting said coils wound about a first plurality of said pole elements in series for energization by one phase of current, and having another circuit portion connecting said coils wound about a second plurality of said pole elements in series for energization by a second phase of current, said one and another circuit portions of said supply means, so connected, adapting the associated pole elements to function as first and second phase torque poles, respectively, the total number of said pole elements on said body portion divided by the number of phases provided by said power supply means being an even number, said first and second phase torque poles being interposed with one another and disposed with respect to said sensor poles, about said body portion, so as to provide a magnetically balanced configuration when said torque poles are energized.

4,687,962

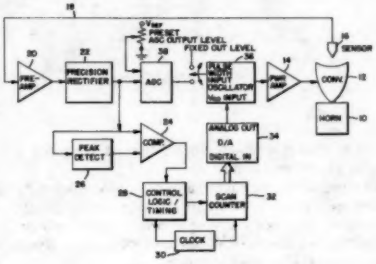
ULTRASONIC HORN DRIVING APPARATUS AND METHOD WITH ACTIVE FREQUENCY TRACKING

Lawrence E. Elbert, Huntington Beach, Calif., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Dec. 15, 1986, Ser. No. 941,977

Int. Cl.[4] H01L *41/08;* B01F *11/00*

U.S. Cl. 310—316 9 Claims



1. Apparatus for driving an ultrasonic horn at a resonant frequency actively determined during operation of the horn under varying load conditions, comprising:

frequency scanning and drive means for driving an ultrasonic horn with a drive signal of determined amplitude and frequency;

feedback means in the vicinity of the horn for sensing ultrasonic vibration waves from the horn in an operating environment when driven by said frequency scanning and drive means, and for producing an output signal corresponding to the frequency and amplitude of said ultrasonic waves;

rectifier means for detecting the output signal of said feedback means and for developing a direct current amplitude signal representative of the amplitude of said output signal;

peak detector means coupled to said rectifier means for developing a peak signal corresponding to the maximum

level of said amplitude signal attained during a first scan of said frequency scanning and drive means, wherein said drive signal is at a fixed amplitude but is varied in frequency between limits about a nominal frequency;

comparator means coupled to said rectifier means and said peak detector means for comparing said amplitude signal and said peak signal with one another over a second scan of said frequency scanning and drive means between said frequency limits with said fixed amplitude drive signal, and for producing a match signal indicative of a resonant condition for said horn when said amplitude and said peak signals are substantially equal; and

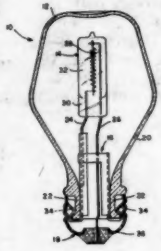
control means coupled to said comparator means and said frequency scanning and drive means for controlling said first and said second scan operations and interrupting said second scan in response to said match signal, and for enabling said scanning and drive means to continue to operate the horn at a frequency corresponding to said resonant condition for a given time period.

4,687,963

TUNGSTEN-HALOGEN ELECTRIC LAMP WITH PERMEABLE MEANS CLOSING AN OUTER ENVELOPE

Peter R. Gagnon, Georgetown; Robert M. Griffin, Hamilton, and Stephen F. Kimball, No. Andover, all of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Continuation of Ser. No. 469,844, Feb. 25, 1983, abandoned.
This application May 12, 1986, Ser. No. 862,161
Int. Cl.[4] H01J *5/54;* H01K *1/46*
U.S. Cl. 313—17 **5 Claims**



1. An integral double-enveloped electric lamp for general lighting applications comprising:

(a) an outer envelope having a light-transmissive body and a neck open to the ambient atmosphere outside of said outer envelope, said body having approximately uniform light-transmissiveness over all portions thereof, said neck having mounting means formed therein;

(b) an inner envelope being a hermetically sealed tungsten-halogen capsule;

(c) a frame-assembly for mounting said tungsten-halogen capsule within said outer envelope, said frame-assembly being formed from a stiff electrically conductive material, said frame-assembly having first and second ends, said tungsten-halogen capsule being mounted on said first end, said second end being engaged with said mounting means of said neck;

(d) a base mounted on said neck closing said outer envelope such that said closing is permeable to said ambient atmosphere, said base being engaged with said second end of said frame-assembly such that said frame-assembly is securely mounted on said mounting means of said neck;

(e) an atmosphere within said outer envelope, said atmosphere being the same as said ambient atmosphere; and

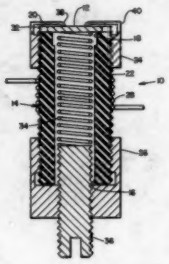
(f) means within said outer envelope for completing an operational electrical circuit between said tungsten-halogen capsule and said base, said electrical circuit including said frame-assembly as a portion thereof.

4,687,964

APPARATUS FOR MOUNTING A FIELD EMISSION CATHODE

Ben T. Ebihara, Strongsville, and Ralph Forman, Rocky River, both of Ohio, assignors to The United States of America as represented by the Administrator National Aeronautics & Space Administration, Washington, D.C.

Filed May 9, 1985, Ser. No. 732,321
Int. Cl.[4] H01J *1/20, 1/30*
U.S. Cl. 313—237 **8 Claims**



1. Apparatus for mounting a field emission cathode chip having an outwardly facing gate film and an oppositely facing base comprising

a support member of an insulating material for engaging the base of said cathode chip having a pair of cross grooves at right angles to each other extending into said support member from the end thereof adjacent to said chip and a substantially circular recess at the intersection of said cross grooves extending into said support member from said end for receiving said chip and positioning the same.

a first electrically conductive member removably mounted on said support member for maintaining said chip in engagement with said support member when said chip is in said recess, said first electrically conductive member being in electrical contact with said gate whereby said electrically conductive member forms a portion of said gate,

a second electrically conductive member mounted on said support member remote from said first electrically conductive member, and

means for electrically connecting said base of said chip to said second electrically conductive member whereby said second electrically member forms a portion of the base electrical circuit.

4,687,965

CAPPED ELECTRIC LAMP

Rudolf Sanders, and Godefridus G. van Seggelen, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 12, 1985, Ser. No. 722,635
Claims priority, application Netherlands, Mar. 7, 1985, 8500644
Int. Cl.[4] H01J *5/48, 5/50*
U.S. Cl. 313—318 **11 Claims**

1. A capped electric lamp comprising:

(a) a gas filled translucent lamp vessel having a wall and a vacuum-tight seal;

(b) an electric element arranged inside said lamp vessel;

(c) current supply conductors extending through said wall of said lamp vessel and connected to said electric element;

(d) a metal clamping plate having an opening and lugs projecting along said opening, said seal of said lamp vessel firmly fixed within said opening by said lugs, said clamping plate having a substantially circular-cylindrical flanged edge;

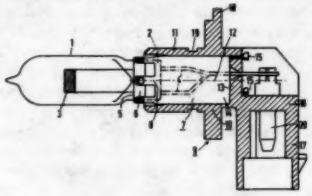
(e) a substantially circular-cylindrical metal sleeve having a

first and a second end, said first end being telescopically joined with said flanged edge of said clamping plate and secured thereto;

(f) a lamp cap made of synthetic material and having a dish-shaped part, said dish-shaped part having a substantially circular-cylindrical wall portion with an axis and a bottom, said second end of said metal sleeve being fixed in said dish-shaped part;

(g) conducting contact members electrically coupled to said current supply conductors; and

(h) the improvement therein comprising



(i) lugs projecting from said metal sleeve for engaging said dish-shaped part of said lamp cap;

(ii) a panel projecting downwardly from said bottom of said dish-shaped part of said lamp cap;

(iii) a sleeve-shaped wall portion connecting to said panel and extending at a right angle to said axis of said cylindrical wall portion of said lamp cap; and

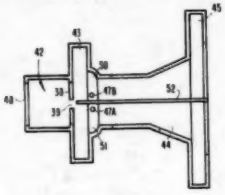
(iv) said contact members being anchored in said panel, said contact members being extended at right angles to said axis of said cylindrical wall part of said lamp cap and surrounded by said sleeve-shaped wall portion.

4,687,966

DEFLECTION YOKE FOR ADHESIVE ASSEMBLY AND MOUNTING

Charles B. Carroll, Trenton, N.J., and David L. Houston, Indianapolis, Ind., assignors to RCA Corporation, Princeton, N.J.

Filed Aug. 27, 1986, Ser. No. 900,956
Int. Cl.[4] H01S 9/00; H04N 5/64
U.S. Cl. 313—440 **2 Claims**



1. A display system for a video display apparatus comprising:

a cathode ray tube;

a deflection yoke, mounted on said cathode ray tube by a quantity of adhesive, comprising:

line rate deflection coils;

field rate deflection coils;

an insulating member, supporting said line and field rate deflection coils comprising:

an adhesive ingress port disposed at the rear of said insulator;

first and second adhesive distribution channels, circumferentially disposed about opposite sides of said cathode ray tube, for distributing said adhesive about the circumference of said cathode ray tube;

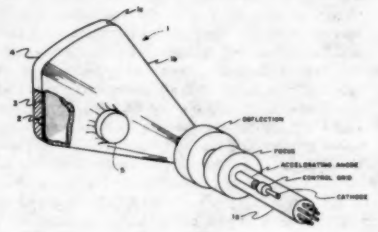
at least one egress port from each of said first and second distribution channels for directing the flow of said adhesive to the region between the interior of said deflection yoke and the surface of said cathode ray tube for attaching said deflection yoke to said cathode ray tube.

4,687,967

INFRARED IMAGE CATHODE RAY TUBE

Gerald A. Rusche, Fairfax City, and Henry A. Forsch, Falls Church, both of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 3, 1985, Ser. No. 730,014
Int. Cl.[4] H01J 31/00
U.S. Cl. 313—477 R **2 Claims**



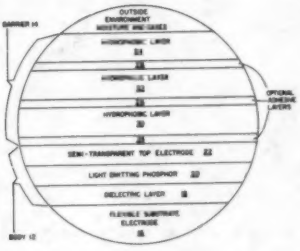
1. A cathode-ray tube for producing an infrared image, wherein said tube includes an envelope having a faceplate, a cone portion, and a neck portion, means for producing an electron beam, means for modulating, for accelerating, for focusing, and for deflecting said electron beam, wherein said faceplate includes a target face consisting of a metal substrate with a regular array of electron-absorbing and infrared-emitting islands or mesas thereon, wherein said mesas or islands are within said envelope and onto which said electron beam scans as deflected, and an infrared-transparent window in said cone portion through which said target face may be viewed, wherein said target face produces an infrared image in response to said electron beam.

4,687,968

ENCAPSULATED ELECTROLUMINESCENT LAMP

Paul D. Frayer, Martinez, Ga., assignor to Rogers Corporation, Rogers, Conn.

Filed Aug. 12, 1985, Ser. No. 765,004
Int. Cl.[4] H05B 33/04
U.S. Cl. 313—509 **12 Claims**



1. In an electrolumiscent lamp having a lamp body comprising a phosphor-particle-containing layer disposed between corresponding upper and lower electrodes that are adapted to apply an excitation potential to said phosphor particles, the upper electrode being light transmissive to radiation from said particles, and having a transparent barrier comprising a multilayer film disposed over said lamp body,

the improvement wherein,

said barrier comprises an integral multilayer polymeric film,

a first (innermost) layer of barrier material being disposed in face-to-face contact with the exposed outer surface of said lamp body and being integrally bonded thereto, the substance of said first (innermost) layer being hydrophobic, having a characteristic vapor transmission rate significantly below the vapor transmission rate of the substance of the contacting surface of said lamp body,

a second layer of barrier material being disposed in integral face-to-face contact with the outer surface of said first barrier layer and bonded thereto, the substance of said second barrier layer being hydrophilic, having a vapor transmission rate significantly greater than the vapor transmission rate of the substance of said first barrier layer, said first barrier layer disposed between said lamp body and said second barrier layer, and

a third layer of barrier material being disposed in integral face-to-face contact with the outer surface of said second barrier layer and bonded thereto, the substance of said third barrier layer being hydrophobic, having a vapor transmission rate significantly less than the vapor transmission rate of the substance of said second barrier,

whereby the substances of said barrier layers are chosen to provide alternating zones of hydrophobic and hydrophilic character, the innermost barrier layer in contact with said lamp body being of hydrophobic character, with interfacial boundaries between said layers, to restrict and delay permeation of moisture through said barrier material into said lamp body, the effective retardation of vapor transmission through said barrier material into said lamp body being greater than the sum of the retardation characteristics of the substances of said individual barrier layers.

4,687,969

DISCHARGE TUBE FOR A HIGH PRESSURE METAL VAPOR DISCHARGE LAMP AND A METHOD OF MANUFACTURING THE SAME

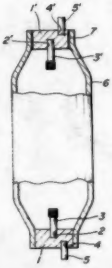
Takehiro Kajihara, Komaki; Senji Atsumi, Kakamigahara, and Hirotsugu Izumiya, Nagoya, all of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Filed Jul. 22, 1985, Ser. No. 757,506

Claims priority, application Japan, Aug. 31, 1984, 59-183294

Int. Cl.[4] H01J *17/18, 61/36*

U.S. Cl. 313—625 **7 Claims**



1. A discharge tube for a high pressure metal vapor discharge lamp, comprising:

a translucent alumina tubular body having first and second opposite end portions;

first and second end plates comprised of cermet, said cermet having a firing shrinkage factor which is less than a firing shrinkage factor of the translucent alumina tubular body;

first and second electrode support members, said first support member being partially embedded in the first end plate and said second support member being partially embedded in the second end plate and each of said first and second electrode support members being located inside of the translucent alumina tubular body, said first end plate being fitted to the first opposite end portion of the translucent alumina tubular body and bonded thereto, said first opposite end portion being located at a lower position than the second opposite end portion when the high pressure metal vapor discharge lamp is in use, wherein bonding of the first end plate to the first opposite end portion is achieved by shrinkage fitting of the first end plate into the translucent alumina tubular body during a simultaneous sintering of the first end plate to the translucent alumina tubular body and a simultaneous bonding of said first electrode support member to said first end plate, said bonding occuring when the translucent alumina tubular body is fired to be translucent, said second end plate being fitted to the second opposite end portion of the translucent alumina tubular body and being bonded thereto, said second opposite end portion being located at a vertically higher position than the first opposite end portion when the high pressure metal vapor discharge lamp is in use.

5. A method of manufacturing a discharge tube for a high pressure metal discharge lamp, comprising:

inserting a first end plate having a partially embedded electrode support member and a partially embedded electric current conductor into a first end portion of a tubular body, the tubular body comprising high purity alumina, such that the electrode support member may be positioned inside the tubular body and the electric current conductor may be positioed outside the tubular body, said first end plate comprising a cermet which has a firing shrinkage factor which is less than a firing shrinkage factor of the high purity alumina, said first end portion of the tubular body being located at a vertically lower position than a second end portion of the tubular body when the high pressure metal vapor discharge lamp is in use; and

firing the tubular body with said first end plate positioned therein, wherein when the tubular body is fired to become translucent, said first end plate is simultaneously shrink fitted inside of the tubular body and sealingly bonded to the tubular body by sintering and the partially embedded electrode support member and electric current conductor are simultaneously bonded to said end plate.

4,687,970

DIGITAL CATHODE CURRENT CONTROL LOOP

Eugene F. Mussiyn, Carson, and Anand Kelkar, Anaheim, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed May 31, 1985, Ser. No. 740,109

Int. Cl.[4] H05B *39/04, 41/36*

U.S. Cl. 315—106 **15 Claims**

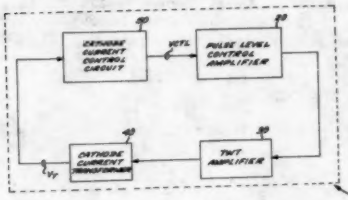
1. A cathode current control circuit for use with a pulsed traveling wave tube (TWT) having a cathode current, comprising:

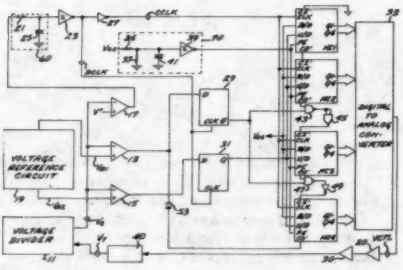
means for providing a comparison signal indicative of the occurrence and amplitude of a TWT cathode current pulse;

comparing means for comparing said comparison signal with at least two predetermined reference signals indicative of a predetermined cathode current level, said comparing means for providing adjustment signals indicative of the adjustment of the TWT cathode current necesary to tend to achieve said predetermined cathode current;

clocking means responsive to said comparison signal for

providing a clock signal delayed relative to the occurrence of a cathode current pulse; and





control means responsive to said adjustment signals and to said delayed clock signal for providing a control signal indicative of an adjusted TWT cathode current level.

4,687,971

POWER SUPPLY FOR DISCHARGE LAMP

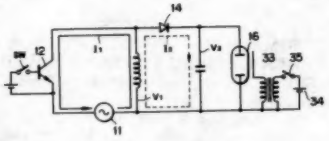
Norimitsu Shimizu, Ebina, Japan, assignor to Fuji Xerox Company, Limited, Tokyo, Japan

Filed Nov. 4, 1985, Ser. No. 794,514

Claims priority, application Japan, Nov. 8, 1984, 59-235846; Mar. 18, 1985, 60-37501[U]; Apr. 5, 1985, 60-71032; May 10, 1985, 60-99271; May 10, 1985, 60-99272

Int. Cl.⁴ H05B *37/00*

U.S. Cl. 315—244 **27 Claims**



1. A power supply circuit for a discharge lamp comprising:

a primary charge current supply means for accumulating energy; said primary charge current supply means including an alternating current source, accumulates energy while the alternating current is a first phase and supplies said accumulated energy to said primary discharge capacitor while the alternating current is a second, opposite phase and a switching means responsive to zero-crossing of said alternating current to control accumulation and supply of energy;

a single primary discharge capacitor associated with said charge current supply means to receive said accumulated energy at a given timing to be charged, said discharge capacitor supplying power to said discharge lamp to cause emission of light upon discharging; and

a trigger means, associated with said discharge lamp, for triggering energization of said discharge lamp and discharge of said discharge capacitor and therby causing emission of light by said discharge lamp.

4,687,972

RASTER DISTORTION CORRECTION CIRCUITRY FOR A VIDEO DISPLAY APPARATUS THAT INCLUDES A SQUARE-PLANAR PICTURE TUBE

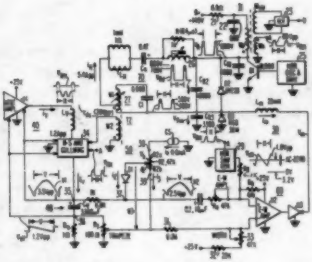
Peter E. Haferl, Adliswil, Switzerland, assignor to RCA Corporation, Princeton, N.J.

Filed Feb. 27, 1986, Ser. No. 833,149

Claims priority, application United Kingdom, Mar. 8, 1985, 8506107

Int. Cl.⁴ H01J *29/56*

U.S. Cl. 315—371 **19 Claims**



1. Video display apparatus with correction of raster distortion, comprising:

a picture tube having a phosphor screen located on a faceplate having an aspherically curved surface contour, with at least one of a minor and major axis exhibiting a curvature that changes from an edge of the faceplate to the center;

deflection means including horizontal and vertical deflection windings for generating respectively therein horizontal and vertical deflection currents to enable an electron beam of said picture tube to scan a raster on said phosphor screen;

a parabola generator coupled to said deflection means for generating a generally parabolically shaped signal that produces a parabolic modulation of the scanning of said electron beam to generally provide correction of a first raster distortion while leaving uncorrected a residual raster distortion due to the change in curvature of said faceplate from said edge to the center; and

means for nonlinearly modifying said (parabolic modulation) parabolically shaped signal as a function of said change in curvature of said faceplate to provide additional modulation of the scanning of said electron beam for correcting said residual raster distortion.

4,687,973

DIGITAL WAVEFORM GENERATOR

Richard E. Holmes; Joe A. Mays, both of Bellbrook, and Michael C. Tyler, Dayton, all of Ohio, assignors to Electronic Image Systems, Inc., Xenia, Ohio

Filed Jul. 9, 1986, Ser. No. 884,138

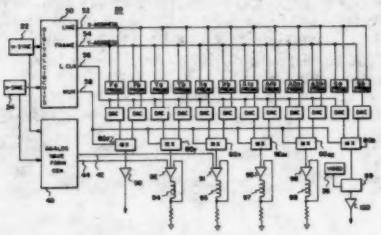
Int. Cl.⁴ H01J *29/56*

U.S. Cl. 315—371 **8 Claims**

1. In a display system where correction factors for a beam have been recorded in memory for a limited number of preselected positions on the face of the display device, the method of providing correcting signals to the display device for all other positions on the face of the display device comprising the steps of

determining the location where the beam is desired to be placed,

selecting those memory locations containing recorded correction factors bordering the selected beam location,



determining the position of the selected beam location relative to preselected memory locations, and

means for interpolating the correction factors in accordance with their position relative to the selected beam position.

4,687,974

METHOD FOR SCANNING FIBER OPTIC TUBE

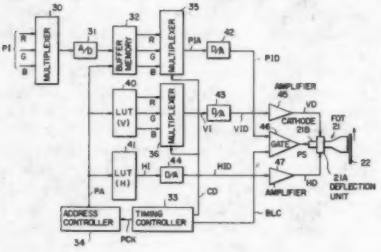
Tadashi Miyakawa, Kaisei, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 14, 1984, Ser. No. 671,763

Claims priority, application Japan, Nov. 17, 1983, 58-216685; Nov. 21, 1983, 58-219294

Int. Cl.⁴ H01J *29/80*; H04N *9/22*

U.S. Cl. 315—375 **5 Claims**



1. A method for scanning a color fiber optic tube of a single electron gun type in which a screen is formed by a plurality of band-shaped phosphors providing different illuminant colors, respectively, comprising the steps of:

vertically deflecting an electron beam from said electron gun in a lateral direction with respect to the plurality of the phosphors; and

horizontally deflecting the electron beam in a longitudinal direction with respect to the phosphors, wherein the horizontal deflection of the electron beam from the electron gun is performed in a stepped manner in which the horizontal deflection is stopped during a time interval when one raster of the vertical deflection of the electron beam sweeps across the plurality of phosphors and the horizontal deflection progresses stepwisely when the vertical deflection is subsequently moved to a next raster.

4,687,975

MOTOR CONTROL WITH RADIO CONTROL DEVICE

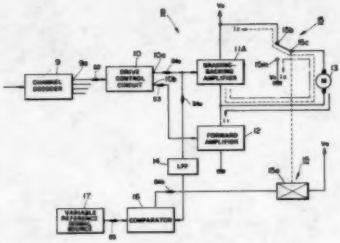
Nobuhiro Suzuki, Mobara, Japan, assignor to Futaba Denshi Kogyo Kabushiki Kaisha, Mobara, Japan

Filed Aug. 12, 1986, Ser. No. 895,817

Claims priority, application Japan, Aug. 27, 1985, 60-130558[U]

Int. Cl.⁴ H02P *1/22*

U.S. Cl. 318—261 **2 Claims**



1. A motor control device comprising:

a drive control means for receiving a command signal from a transmitter to alternatively generate a forward command signal corresponding to a forward command region of a control element on said transmitter side and a braking-backing command signal corresponding to a braking-backing command region of said control element;

a normal rotation drive means for rotating a motor in a normal direction in response to said forward command signal alternatively generated from said drive control means;

a backing reference signal generating means for generating an adjustable backing reference signal;

a discriminating means to which said braking-backing command signal alternatively generated from said drive control means and said backing reference signal generated from said backing reference signal generating means are supplied, said discriminating means discriminating whether said control element of said transmitter side is in a braking region or a backing region; and

a braking-reverse rotation drive means for carrying out braking or reverse rotation of said motor depending upon an output of said discriminating means.

4,687,976

ELECTROMAGNETIC SERVO DEVICE FOR ELECTRIC POWER STEERING SYSTEMS FOR VEHICLES

Yasuo Shimizu, Tochigi, Japan, assignor to Honda Giken Kogyo, Toyko, Japan

Filed Sep. 9, 1985, Ser. No. 773,972

Claims priority, application Japan, Sep. 12, 1984, 59-192390

Int. Cl.⁴ G05B *11/10*

U.S. Cl. 318—432 **8 Claims**

1. In an electromagnetic servo device (**200**) for an electric power steering system for vehicles having a steering wheel and a steered wheel, said servo device (**200**) including:

an input shaft (**1**) adapted to be connected to the steering wheel;

an output shaft (**4**) adapted to be operatively interconnected with the steered wheel;

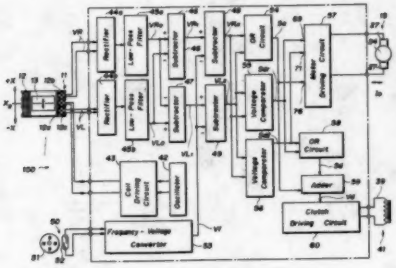
an electric motor (**18**) for providing said output shaft (**4**) with auxiliary torque;

torque detecting means (**11**) for detecting steering torque (Ti) acting on said input shaft (**1**);

vehicle speed detecting means (**50**) for detecting the vehicle speed;

a driving control circuit (**100**) for generating a torque magnitude signal (Sa) and a torque direction signal (Sdr, Sdl),

based on an output signal (VR, VL) from said torque detecting means (11) and an output signal (Vf) from said vehicle speed detecting means (50), to feed said electric motor (18) with an armature current (Io) of such a magnitude and in such a direction as desirous in accordance with both said torque magnitude signal (Sa) and said torque direction signal (Sdr, Sdl); and



a dead zone ($2K_1$ or Dl, Dm, Dh) set for said torque magnitude signal (Sa),

an improvement comprising:

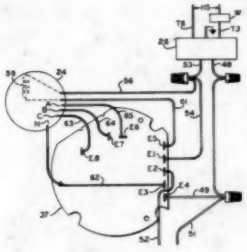
said dead zone ($2K_1$ or Dl, Dm, Dh) of said torque magnitude signal (Sa) having a band width thereof adapted to be widened in accordance with increase of the vehicle speed, in accordance with said output signal (Vf) of said vehicle speed detecting means (50).

4,687,977

ELECTRONICALLY CONTROLLED MOTOR AND METHODS OF OPERATING SAME

Subhash M. Brahmavar, and Ernest W. Litch, III, both of Fort Wayne, Ind., assignors to General Electric Company, Fort Wayne, Ind.

Filed Oct. 22, 1984, Ser. No. 663,654
Int. Cl.[4] H02K *29/00*
U.S. Cl. 318—492 **14 Claims**



1. A method of operating an electronically controlled motor having a structure comprising a stator having at least one excitation winding accommodated on a magnetic core, an electronic control circuit for controlling energization of the excitation winding during motor operation; and means for suppressing current surges in the control circuit and for generating heat while so suppressing current surges, the method comprising the steps of: controlling energization of the motor excitation windings with the electronic control circuit; suppressing current surges in the control circuit with the means for suppressing; and dissipating heat generated by the means for suppressing along the motor structure.

3. In an electronically commutated motor particularly adapted for use in combination with an electronic switching control circuit, comprising a stator having a magnetic core and at least one excitation winding, the improvement comprising a current surge suppressing winding accommodated on the stator, and having means for connecting the suppressing winding in series circuit relationship with the control circuit.

7. A method of operating an electronically controlled motor having a structure comprising a stator having at least one excitation winding accomodated on a magnetic core, an electronic control circuit for controlling energization of the excitation winding during motor operation; and resistor means associated with and forming part of the control circuit that generates heat during operation of the control circuit, the method comprising the steps of: locating said resistor means along the motor structure remote from other components of the control circuit; controlling energization of the motor excitation windings with the electronic control circuit; passing control circuit current through said resistor means and causing said resistor means to become heated; and dissipating heat generated in the resistor means along the motor structure.

9. A method of manufacturing at least part of an electronically commutated motor having a structure comprising a stator having at least one excitation winding accommodated on a magnetic core, an electronic control circuit for controlling energization of the excitation winding during motor operation, and at least one resistor particularly adapted as an electrical circuit element associated with the electronic control circuit for carrying current that is carried by at least one other electronic component that forms part of the electronic control circuit, the method comprising the steps of accommodating the at least one excitation winding on the magnetic core, accommodating the at least one resistor on the magnetic core in heat transfer relationship thereto, and subsequently interconnecting the at least one resistor with at least one other component of the electronic control circuit.

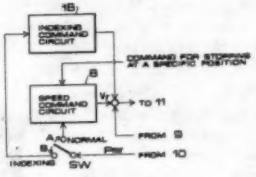
12. An electronically commutated motor system comprising an electronically commutatable motor, a circuit board mounted electronic control circuit for controlling said motor, and a wire wound resistor connected with and electrically forming a part of said electronic control circuit; wherein said wire wound resistor is carried by said motor and is located remotely from said circuit board.

4,687,978

POSITIONING INDEXING CONTROL DEVICE FOR INVERTER APPARATUS

Takahiro Hayashida, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 16, 1985, Ser. No. 788,213
Claims priority, application Japan, Oct. 17, 1984, 59-216336
Int. Cl.[4] G05B *11/28*
U.S. Cl. 318—599 **1 Claim**



1. In a positioning-indexing control device for an inverter apparatus which supplies a pulse-width modulated current to drive a motor, said control device including a pulse detecting circuit responsive to a mark pulse and a position pulse indicating a rotational position of a motor for detecting a position for said motor to stop and for outputting a first in-position signal, and a speed command circuit for outputting a speed command to said inverter apparatus for determining the rotational speed of said motor until said first in-position signal is output, said positioning-indexing control device futher comprising an in-

dexing command circuit and a switch movable to a first position for connecting said pulse detecting circuit to said speed command circuit for transmitting said first in-position signal from said pulse detecting circuit to said speed command circuit, said indexing command circuit having an output connected to the output of said speed command circuit to provide a second speed command until a second in-position signal is output from said pulse detecting circuit, said second speed command having polarity indicative of the rotating direction of said motor and a value smaller than the speed command output from said speed command circuit.

4,687,979

CONTROL SYSTEM FOR A ROBOTIC GRIPPER

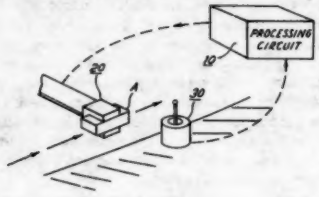
Mark Ashton, Harrow, and Godfrey N. Hounsfield, Twickenham, both of England, assignors to EMI Limited, Hayes, England

Filed Jan. 10, 1986, Ser. No. 817,582

Claims priority, application United Kingdom, Jan. 17, 1985, 8501178

Int. Cl.[4] G05B *1/06*

U.S. Cl. 318—638 **5 Claims**



1. A control system for a robotic gripper, the control system including

a processing circuit for controlling movement of the gripper on a prearranged path to establish, at a position intermediate the ends of said path, contact between a contact sensor mounted on the gripper, or at a reference position, and an article located at a workstation, or carried by the gripper respectively,

the sensor being arranged to generate an electrical signal in response to a said contact being established and said electrical signal being utilised by the processing circuit to evaluate the position of the article with respect to said reference position or the gripper, the sensor including a probe member displaceable with respect to a base portion of the sensor thereby to allow substantially continuous, uninhibited movement of the gripper on said path, beyond the intermediate position, and allowing said sensor and article to become disengaged.

4,687,980

X-Y ADDRESSABLE WORKPIECE POSITIONER AND MASK ALIGNER USING SAME

Edward H. Phillips, Mountain View, and Karl-Heinz Johannsmeier, Los Altos, both of Calif., assignors to Eaton Corporation, Cleveland, Ohio

Division of Ser. No. 198,364, Oct. 20, 1980, Pat. No. 4,425,537. This application Jan. 5, 1984, Ser. No. 568,297

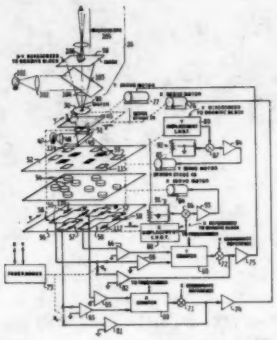
Int. Cl.[4] G05B *1/06*

U.S. Cl. 318—640 **31 Claims**

1. In an X-Y addressable workpiece positioning method, the steps of;

coupling a workpiece to a work stage moveable in X and Y directions within a common plane of movement defined by the X and Y directions and within which the workpiece is to be positioned, said work stage having a two dimensional array of X and Y coordinate positioning indicia affixed thereto for effecting positioning of the workpiece;

projecting an enlarged image of at least a portion of the positioning indicia array onto a relatively stationary sensor stage for sensing the enlarged image of the positioning indicia array for deriving an output determinative of the



sensed X and Y coordinates of the enlarged image portion of the positioning array;

comparing the sensed X and Y coordinates with the X and Y coordinates of a reference address to derive an error output; and

moving the workpiece and positioning array in response to the error output to a reference address.

4,687,981

STEPPING MOTOR

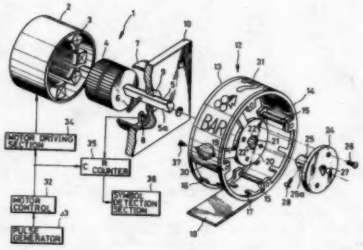
Kazuo Okada, Tokyo, Japan, assignor to Kabushiki Kaisha Universal, Tochigi, Japan

Filed Mar. 25, 1986, Ser. No. 843,664

Claims priority, application Japan, Mar. 25, 1985, 60-41566[U]

Int. Cl.[4] H02P *8/00*

U.S. Cl. 318—696 **10 Claims**



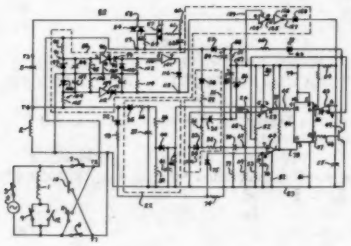
1. In a stepping motor comprising a rotary shaft, a rotor fixed to said rotary shaft, a stator within a housing, said rotor rotating within said stator, and means to supply driving pulses to said stepping motor; the improvement comprising signal activating means on said rotary shaft, and a sensor for detecting said signal activating means and adapted to produce a signal each revolution of said rotary shaft, said signal activating means and said sensor being disposed within said housing.

4,687,982

INSTANT REVERSING CIRCUIT

Rasappa Palaniappan, Rockford, Ill., assignor to PT Components, Inc., Milwaukee, Wis.

Filed Feb. 27, 1986, Ser. No. 834,208
Int. Cl.[4] H02P 1/42
U.S. Cl. 318—763 **14 Claims**



1. In a single phase AC motor having a main winding and an auxiliary winding both connectable to an AC power source, and having a start switch for automatically connecting and disconnecting said auxiliary winding to and from said AC source in starting and running modes, respectfully, and having a user operated reversing switch for reversing the voltage polarity applied from said AC source to one of said windings relative to the other of said windings, the improvement comprising means electrically sensing said polarity reversal during said running mode and automatically reconnecting said auxiliary winding to said AC source.

4,687,983

ALTERNATION CONTROL SYSTEM HAVING MANUAL CURRENT SELECTION CAPABILITY AND VOLTAGE DEPENDENT CUTOFF CIRCUIT

Edgar J. Beyn, 8 Revell St., Annapolis, Md. 21401

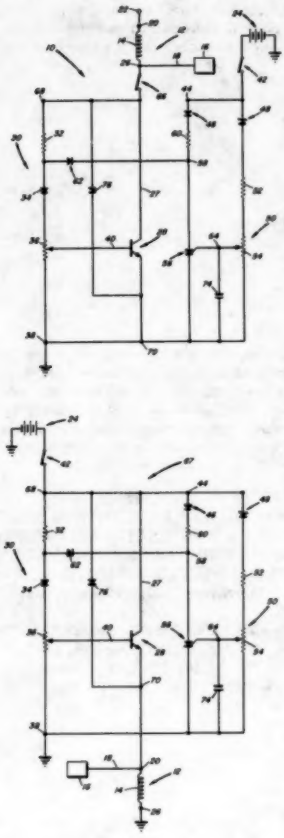
Filed Jan. 17, 1985, Ser. No. 692,232
Int. Cl.[4] H02J 7/14
U.S. Cl. 322—28 **13 Claims**

1. A system for the controlled charging of a secondary battery operating in association with an engine and including an alternator having an alternator field coil and alternator field coil terminals, the alternator being normally controlled by a voltage regulator connected to the alternator field coil, the battery being charged by the engine through the alternator, the system comprising:

means adapted to be manually operated for selecting an alternator output or charging current;

means connected to the battery for sensing the voltage of the battery and for generating a signal indicative of the battery voltage; and,

control means connected to the alternator field coil through the alternator field coil terminals in parallel to the voltage regulator and including cutoff circuit means connected to the battery voltage sensing means and responsive thereto for discontinuing and preventing reapplication of charging current to the battery when the battery has reached full charge, when the charging current has become excessive as the battery approaches full charge or when the



selected charging current is excessive for the capacity of the battery.

4,687,984

JFET ACTIVE LOAD INPUT STAGE

James R. Butler, San Jose, Calif., assignor to Precision Monolithics, Inc., Santa Clara, Calif.

Filed May 31, 1984, Ser. No. 615,996
Int. Cl.[4] H03F 3/68
U.S. Cl. 323—315 **14 Claims**

10. An active load input circuit, comprising:

first and second voltage busses of opposite polarity,

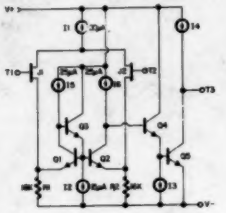
a first current source connected to be supplied by the first voltage bus,

first and second junction field effect transistors (JFETs) each having a source, drain and gate, the JFET sources being connected in common to receive current from the first current source, their gates being connected to respective differential amplifier input terminals, and the in drains providing load drive currents,

first and second load resistors of substantially equal resistance values connected between the drains of the first and second JFETs, respectively, and the second voltage bus,

second an third substantially equal current sources connected to be supplied by the first voltage bus,

first and second bipolar load transistors having their collector-emitter circuits connected to conduct current from the second current source to the first resistor, and from the third current source to the second resistor, respectively, said load transistors having a common base connection, and



means for supplying a common bias signal to the first and second load transistors to render them conductive,

whereby substantially equal currents are transmitted through the two load resistors during common mode operation, thereby maintaining the drains of the two JFETs at substantially equal voltages.

4,687,985

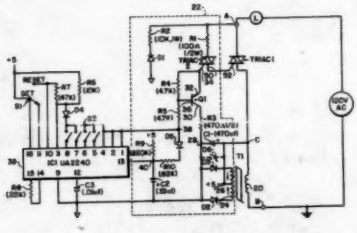
TWO TERMINAL CONTROL SWITCH HAVING A MAIN SWITCH AND A SATURABLE CURRENT TRANSFORMER WHOSE PRIMARY WINDING IS SERIES CONNECTED WITH THE MAIN SWITCH

Ira J. Pitel, Morristown, N.J., assignor to Tork, Inc., Mt. Vernon, N.Y.

Continuation of Ser. No. 791,507, Oct. 25, 1985. This application Jan. 12, 1987, Ser. No. 4,842

Int. Cl.[4] G05F *3/04*

U.S. Cl. 323—323 **4 Claims**



1. An arrangement for controlling the ON and OFF time intervals for a load comprising:

a pair of main switch terminals adapted to be closed for connecting an AC power source to a load;

a first, main, solid state switch connected between said terminals and having conductive and non-conductive states;

a control circuit controlling said states of said main switch;

means for obtaining DC control circuit power from said AC power source, said means comprising:

(1) a full wave rectifier;

(2) a transformer having a primary winding and a secondary winding, said main switch and the primary winding of said transformer being connected in series;

(3) said secondary winding including a center tap which constitutes one side of said DC control circuit power, a first junction connected to said center tap, and a second junction defining the other side of said DC power;

(4) a capacitor, one end which is directly connected to said first junction located between said main switch and said primary winding, the other end of said capacitor being directly connected to said second junction; one end of said rectifier also being directly connected to said second junction, the other end of said rectifier being connected through said secondary winding to said center tap, and a zener diode in shunt with said capacitor.

4,687,986

METHOD AND APPARATUS FOR MEASURING THE STREAMING POTENTIAL OF A PARTICLE SUSPENSION

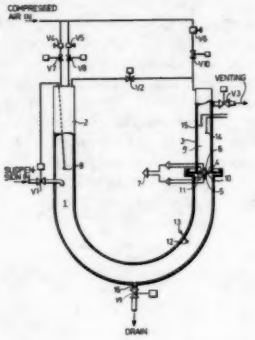
Rune Eriksson, Mariestad, Sweden, assignor to AB Innomatic, Mariestad, Sweden

Filed Jun. 17, 1986, Ser. No. 875,042

Claims priority, application Sweden, Jun. 18, 1985, 8503029; May 20, 1986, 8602280

Int. Cl.[4] G01N *27/00*

U.S. Cl. 324—71.1 **12 Claims**



1. A method of simultaneously and continuously measuring both the streaming potential and the rate of drainage of a particle suspension, comprising the steps of:

(a) introducing a particle suspension into a measuring vessel (1),

(b) alternately subjecting the particle suspension, to two different, predetermined, relatively low but significantly dissimilar pressures to force the suspension through a screen (4) transversely interposed across a flow path (3) defined by the vessel such that the screen intercepts particles in the suspension,

(c) simultaneously with step b), venting the vessel above the screen,

(d) measuring the voltage across the screen at each of the two pressures,

(e) subtracting the voltage measured at a lower one of the pressures from the voltage measured at a higher one of the pressures,

(f) measuring the resistance of the suspension and determining the conductivity therefrom,

(g) measuring the temperature of the suspension and determining the viscosity therefrom,

(h) computing the streaming potential of the suspension from the values of the conductivity and viscosity of the suspension and from the differential pressure between the upstream side of the particles collected on the bottom side of the screen and the downstream side of the screen as determined by the voltage measurements as well as from a predetermined suspension dielectric constant,

(i) measuring the velocity of flow of filtrate downstream of the screen, and

(j) computing the rate of drainage of the suspension from the

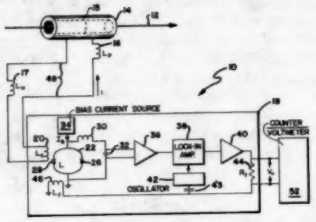
value of the velocity of flow of filtrate at a known differential pressure between the upstream and downstream sides of the screen.

4,687,987

BEAM CURRENT SENSOR

Moyses Kuchnir, Elmhurst, and Frederick E. Mills, Elburn, both of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Sep. 28, 1984, Ser. No. 655,487
Int. Cl.[4] G01R *19/00*
U.S. Cl. 324—71.3 **12 Claims**



1. A sensor for measuring the current of a beam of charged particles, comprising:

a. superconducting probe means comprised of a hollow probe having interior and exterior surfaces and surrounding the beam of charged particles, having a continuous slot surrounding the beam of charged particles whereby said interior and exterior surfaces join each other, said slot thereby forming first and second ends of said superconducting probe means such that a current is induced on said exterior surface of said superconducting probe means, said induced current on said exterior surface acting to exclude magnetic flux associated with the beam from interior regions of said probe means in accord with the Meisner effect; and

b. superconducting detection means coupled to said probe means and responsive to the current induced therein for providing an output voltage representing the current of the beam of charged particles.

4,687,988

WEIGHTED RANDOM PATTERN TESTING APPARATUS AND METHOD

Edward B. Eichelberger, Hyde Park, N.Y.; Roger N. Langmaid, New Fairfield, Conn.; Eric Lindbloom, Poughkeepsie, N.Y.; Franco Motika, Hopewell Junction, N.Y.; John L. Sinchak, Wappingers Falls, N.Y., and John A. Waicukauski, Hopewell Junction, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 24, 1985, Ser. No. 748,288
Int. Cl.[4] G01R *31/28*
U.S. Cl. 324—73 AT **3 Claims**

1. An improvement in the method of testing of a complex integrated device having a LSSD shift register and accessible fewer input and output teriminals than the number of internally interconnected logic circuit elements coupled thereto which renders the elements inaccessible for discrete direct testing comprising the steps of:

A. producing a pseudo random pattern containing one element for each accessible input terminal and inaccessible circuit element of the device to be tested;

B. loading a portion of said pattern into the LSSD shift register of the device to be tested;

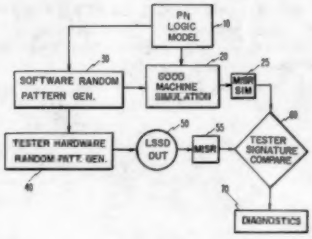
C. applying a portion of said pattern to the accessible input terminals of the device under test;

D. causing the device to operate in response to the inputs at the accessible input terminals and the data in the LSSD shift register;

E. gating the signals from the logic circuit elements in the device under test into the LSSD shift register;

F. unloading data from the LSSD shift register; and

G. comparing the unloaded data with the precalculated data for a known good device to determine if the device under test failed;



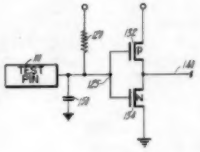
a portion of said pseudo random pattern being operative to modify said loading of the LSSD shift register, said unloading of said LSSD shift register or the gating of patterns from the LSSD shift register to the inaccessible logic elements in the device under test, thereby providing a means for detecting all potential stuck faults resident in the LSSD combinational networks as well as a means for detecting faults in and amongst the LSSD shift clocks, the system clocks, and associated gating networks.

4,687,989

CMOS POWERLESS ROM CODE MASK OPTION SELECT

Harold L. Davis, Colony, and Robert D. Lee, Denton, both of Tex., assignors to Thomson Components-Mostek Corp., Carrolton, Tex.

Filed Nov. 1, 1984, Ser. No. 667,182
Int. Cl.[4] G01R *31/28*
U.S. Cl. 324—758 R **5 Claims**



1. A testable CMDS integrated circuit for specifying a circuit parameter by maintaining a preselected option node at a predetermined static voltage, comprising:

a semiconductor substrate having an electrical circuit formed therein, said electrical circuit having at least one option node for forcing a subcircuit of said electrical circuit into a predetermined state dependent on a voltage at said option node;

a P-channel transistor connected between a power supply voltage terminal and said option node;

an N-channel transistor connected between said option node and ground;

a gate node common to both of said P-channel and N-channel transistors; and

voltage means connected to said gate node for supplying a steady-state voltage to said gate node; characterized in that:

said voltage means comprises a resistive element, having a

predetermined resistance, connected between said gate node and a current supply terminal;

said circuit further comprises a test pin, exposed outside any covering layers of said integrated circuit and connected directly to said gate node, whereby voltage supplied to said test pin may override said voltage means to control said gate node.

4,687,990

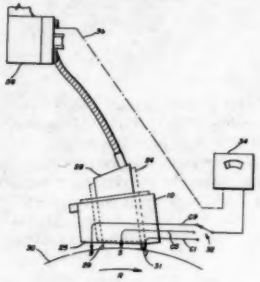
BRUSH POTENTIAL CURVE TRACER

Hilvan A. Finch, Schenectady, N.Y., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jun. 21, 1985, Ser. No. 747,202

Int. Cl.[4] G01R *31/02*; H02K *11/00*

U.S. Cl. 324—158 MG **4 Claims**



1. In a motor or generator comprising a commutator and a brush, means for determining commutating characteristics comprising:

first means for positioning a plurality of probes in juxtaposition with the brush and in contact with the commutator, said first means comprises a holder for said probes, said probeholder is mounted on a support for the brush, said probes are aligned with a direction of rotation of the commutator, and said probes span a distance greater than the dimension of the brush in the direction of rotation of the commutator; and

second means associated with said probes for measuring electrical current charactersitcs of the respective probes, said second means comprises means for measuring electrical current through each of said probes and voltage

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4,687,991

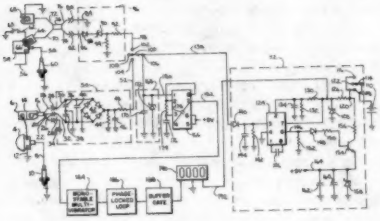
TWO AND FOUR CYCLE DIGITAL TACHOMETER

Francis E. Kruncos, Fond du Lac, assignor to Brunswick Corporation, Skokie, Ill.

Filed Aug. 30, 1985, Ser. No. 771,216

Int. Cl.[4] G01P *3/54*

U.S. Cl. 324—169 **10 Claims**



1. A digital tachometer for an internal combustion engine having an ignition coil with a primary low voltage lead and a secondary high voltage lead, comprising:

sensing means for sensing ignition pulses on said primary lead;

signal conditioning means operatively coupled to said sensing means for conditioning and filtering said pulses;

solid state digital timer means operatively coupled to said signal conditioning means and responding to a pulse from said signal conditioning means and outputting an output pulse of given delay, and ignoring other pulses from said signal conditioning means during said given delay, and outputting another output pulse of given delay in response to the next pulse from said signal conditioning means following said given delay of said first mentioned output pulse;

phase-locked loop means operatively coupled to said timer means and responding to said delay pulses from said timer means and outputting a pulse train having a frequency which is a function of the frequency of said delay pulses from said timer means; and

counter and display means operatively coupled to said phase-locked loop means and counting pulses in said pulse train as a function of time and displaying same to indicate revolutions of said engine per unit time.

4,687,992

METHOD FOR TESTING PARTS, ESPECIALLY OF NUCLEAR PLANTS, BY MEANS OF EDDY CURRENT

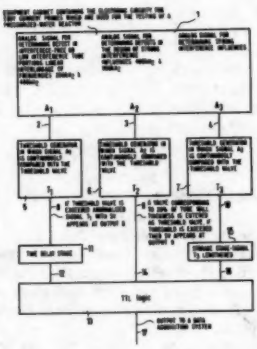
Ludwig von Bernus, Hemhofen; Georg Bögelein, and Rudolf Waldhütter, both of Erlangen, all of Fed. Rep. of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mülheim, Fed. Rep. of Germany

Filed Mar. 29, 1985, Ser. No. 717,888

Claims priority, application Fed. Rep. of Germany, Mar. 30, 1984, 3411898

Int. Cl.[4] G01N *27/90*; G01R *33/12*

U.S. Cl. 324—232 **12 Claims**



1. Method for testing tubes to determine tube defects, particularly in heat exchangers of nuclear installations, by means of eddy current, and suppressing interferences due to design and construction of the tubes to be tested, which comprises:

generating three eddy current signals designated 1st signal, 2nd signal and 3rd signal with different frequencies in a tube to be tested, the

1st signal being generated in interference-free or low interference tube regions to ascertain defects in such tube regions, the

2nd signal being generated in a tube region which has construction-caused interferences to ascertain defects in said region in the presence of strong interference influence, and the

3rd signal being generated in the tube to determine strong

interference quantities therein in said region of strong interference influence, continuously, separately and simultaneously monitoring said three signals, comparing each signal with a predetermined threshold value, obtaining output signals designated 1st output signal, 2nd output signal and 3rd output signal corresponding to 1st signal, 2nd signal and 3rd signal if the predetermined threshold values are exceeded, and indicating a defect in the tube from said output signals upon the occurrence of one of (a) and (b) below:

(a) only the 1st signal reaches its threshold and the 1st output signal is obtained,

(b) the 1st and 2nd signals reach their thresholds together and the 1st and 2nd output signals are obtained.

4,687,993

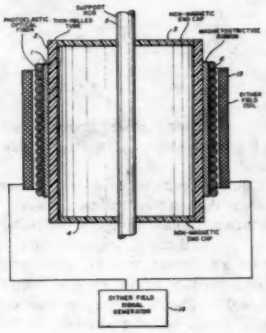
FIBER OPTIC MAGNETIC FIELD SENSING TRANSDUCER HAVING A RESONANT STRUCTURE

Marc D. Mermelstein, Chevy Chase, Md., assignor to Geo-Centers, Inc., Newton Center, Mass.

Filed Jan. 23, 1986, Ser. No. 821,610

Int. Cl.[4] G01R *33/032*

U.S. Cl. 324—244 **5 Claims**



1. A transducer for sensing a constant or slowly varying magnetic signal field, comprising

(A) a resonant structure having

(a) a thin wall hollow cylindrical shell,

(b) end caps secured to and closing off each end of the shell whereby a hollow chamber is provided,

(c) a magnetostrictive ribbon wrapped around the cylindrical wall of the shell and responsive to the component of the magnetic signal field that is along the longitudinal axis of the cylindrical shell,

(d) a birefringent optical fiber coiled around the magnetostrictive ribbon,

(e) means affixing each end of the optical fiber coil to the magnetostrictive ribbon, and

(B) means proximate said resonant structure for establishing an alternating magnetic dither field within the domain of said magnetic signal field, said dither field having a frequency at which the resonant structure resonates.

4,687,994

POSITION SENSOR FOR A FUEL INJECTION ELEMENT IN AN INTERNAL COMBUSTION ENGINE

David E. Fulkerson, Minnetoaka, and Marvin L. Geske, Plymouth, both of Minn., assignors to George D. Wolff, Winter Haven, Fla.

Filed Jul. 23, 1984, Ser. No. 633,235

Int. Cl.[4] G01R *33/06*

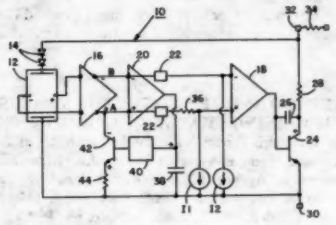
U.S. Cl. 324—251 **10 Claims**

1. An electronic circuit for dynamically sensing and processing signals representative of changes in a magnet field, said circuit comprising:

means for sensing a change in a magnetic field external to said circuit and providing an output representative of said change;

circuit means electronically coupled with said output of said sensing means for providing an output indicating the presence of said magnetic field change; and

a nulling circuit coupled with said output of said sensing means and across said indicating circuit means for nulling



said electronic circuit responsive to said sensing means output, to thereby avoid ambient magnetic fields, temperature and process variations, and wherein said nulling circuit comprises a capacitor coupled to the output of said nulling circuit, means for charging and discharging said capacitor responsive to any imbalance in the input to said nulling circuit, and circuit means coupling said capacitor with said output of said sensing means for nulling any imbalance during the charging or discharging of said capacitor.

4,687,995

SECONDARY FIELD DIELECTRIC CONSTANT AND/OR RESISTIVITY WELL LOGGING SYSTEM AND METHOD

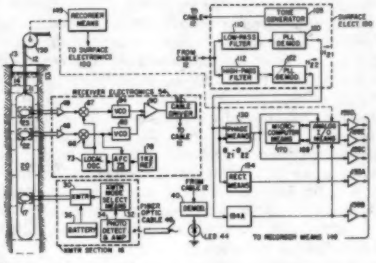
Wayne F. Warren; Theodore W. Nussbaum; Percy T. Cox, and Donald L. Johnson, all of Houston, Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Mar. 5, 1984, Ser. No. 586,465

The portion of the term of this patent subsequent to Nov. 11, 2003, has been disclaimed.

Int. Cl.[4] G01V *3/30, 3/28, 3/10, 3/18*

U.S. Cl. 324—341 **12 Claims**



1. Apparatus for determining the dielectric constant and/or resistivity of earth formations traversed by a borehole comprising:

means for transmitting electromagnetic energy into the earth formation from a first location in the borehole at a frequency within a frequency range of 10 MHz to 60 MHz,

receiving means for receiving electromagnetic energy at two locations in the borehole spaced longitudinally from the transmitting means and providing the signals represen-

tative of the total electromagnetic field at those locations, and

determining means connected to the receiving means for determining the dielectric constant and/or resistivity of said formations in accordance with portions of the signals from the receiving means corresponding to secondary electromagnetic fields at the two receiving locations; said determining means includes:

secondary field ratio means for deriving a secondary field ratio from portions of the signals representative of the secondary electromagnetic fields at the two receiving locations, and

phase difference means for deriving a phase difference between the signals provided by the receiving means.

4,687,996

METHOD AND APPARATUS FOR MEASURING REMAINING CHARGE OF GALVANIC CELL

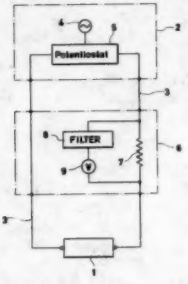
Susumu Okazaki, Ikeda; Shunichi Higuchi, Hirakata; Osamu Nakamura, Ikeda, and Sachio Takahashi, Minoo, all of Japan, assignors to Agency of Industrial Science & Technology, Ministry of International Trade & Industry, Tokyo, Japan

Filed Feb. 7, 1985, Ser. No. 699,090

Claims priority, application Japan, Feb. 9, 1984, 59-23896; Feb. 9, 1984, 59-23897

Int. Cl.[4] G01N *27/46;* **H02J** *7/04;* **G08B** *21/00*

U.S. Cl. 324—436 **8 Claims**



1. A method for measurement of a charge remaining in a galvanic cell, which comprises the steps of:

superposing an AC voltage or current on a DC voltage or current from a reference galvanic cell of know remaining charge to produce an output current or voltage having fundamental tone current or voltage of the same frequency as that of the superposed AC voltage or current and a higher harmonic current or voltage of secondary or higher order;

extracting said higher harmonic current or voltage of secondary or higher order from said output current or voltage of said reference galvanic cell;

measuring the current or voltage value corresponding to said higher harmonic current or voltage to predetermine reference characteristic of said higher harmonic current or voltage with respect to said known remaining charge of said reference galvanic cell;

superposing an AC voltage or current on a DC voltage or current from a measuring galvanic cell under test to produce an output current or voltage having a fundamental tone current or voltage of the same frequency as that of the AC voltage or current superposed on said DC voltage or current and a higher harmonic current or voltage of secondary or higher order;

extracting said higher harmonic current or voltage of secondary of higher order from said output current or voltage of said galvanic cell under test;

measuring current or voltage value corresponding to said higher harmonic current or voltage of secondary or higher order on said galvanic cell under test; and

comparing said measured current or voltage value of said galvanic cell under test with said current or voltage value of said reference galvanic cell having said predetermined reference characteristic, thereby determining the remaining charge of said galvanic cell under test.

4,687,997

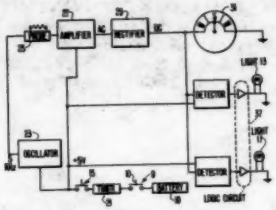
CONTAINER WITH SAFETY FEATURES FOR CLEANSING MEDICAL DEVICES

Frank Tao, Sunnyvale, Calif., assignor to CooperVision, Inc., Mountain View, Calif.

Filed Jun. 22, 1984, Ser. No. 623,401

Int. Cl.[4] G01N *27/02*

U.S. Cl. 324—439 **24 Claims**



1. A system for cleansing medical devices comprising:

a containing means in which the medical device is positionable,

disinfecting solution positionable in said containing means for disinfecting therein the medical device,

an indicating means for indicating that the medical device as been subjected to said disinfecting solution in said containing means for a sufficient period of time, and

neutralizing solution in which the medical device is positionable, after said indicating means has indicated sufficient time, for neutralizing on the medical device the residual of said disinfecting solution.

4,687,998

PULSE WIDTH GENERATING CIRCUIT SYNCHRONIZED WITH CLOCK SIGNAL AND CORRESPONDING TO A REFERENCE VOLTAGE

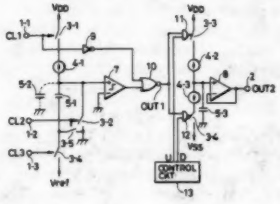
Hiroshi Takatori, Kokubunji; Toshiro Suzuki, Tama; Osamu Matsubara, Kokubunji, and Izuru Yamada, Totsuka, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 29, 1985, Ser. No. 759,865

Claims priority, application Japan, Jul. 27, 1984, 59-155246

Int. Cl.[4] H03K *3/17, 5/22, 5/159, 5/00*

U.S. Cl. 328—58 **6 Claims**



1. A pulse generating circuit comprising:

an integrating capacitor having first and second electrodes;

a first circuit for feeding a constant current to the first elec-

trode of said integrating capacitor through a first switch means which is driven by a first pulse signal;

a second circuit having a second switch means for connecting the first and second electrodes of said integrating capacitor with a first potential in response to a second pulse signal;

a third circuit for connecting the second electrode of said integrating capacitor with a power supply having a reference voltage in response to a third pulse signal having such a predetermined time width so that the first and second electrodes of said integrating capacitor are not connected with said first potential by the second switch means and so that said constant current is fed to the first electrode of said integrating capacitor;

a comparator connected to said first electrode of said integrating capacitor for comparing the potential at said first electrode of said integrating capacitor and said first potential; and

a logic circuit connected to said comparator output and coupled to receive said first pulse signal, said logic circit including means for generating a pulse having a predetermined time width corresponding to said reference voltage.

4,687,999

CIRCUIT FOR RECOVERING THE CARRIER WAVE IN DIGITAL TRANSMISSION SYSTEMS

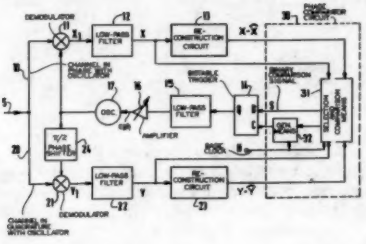
Lydie Desperben, Bois-Colombes; Hikmet Sari, Creteil, and Saïd Moridi, Paris, all of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 23, 1986, Ser. No. 855,527

Claims priority, application France, Apr. 30, 1985, 85 06561

Int. Cl.[4] H03D *3/18*

U.S. Cl. 329—109 **5 Claims**



1. A circuit for recovering the carrier of a digitally modulated wave, said digitally modulated wave having a phase symmetry $2\pi/M$, where M is the symmetry order, comprising:

(a) means for fast automatic acquisition, including:

(i) a voltage-controlled oscillator, having an output at which said carrier is provided, and having a control input for receiving an error signal $\epsilon(\phi)$, said oscillator changing phase in response to said error signal $\epsilon(\phi)$

(ii) a first channel, coupled to receive said digitally modulated wave, said first channel including the following elements in series:

(A) a demodulator producing an in-phase demodulated signal X_1, said demodulator being coupled to receive said digitally modulated wave and said output carrier of said oscillator;

(B) a low-pass filter, coupled to receive said demodulated signal X_1, and producing therefrom a filtered signal X; and

(C) means for determining an error e_x, said means for determining including:

(I) means for producing a reconstructed signal X from said filtered signal X; and

(II) means for combining said reconstructed signal X and said filtered signal X to derive said error $e_x = X - X$;

(iii) a second channel, coupled to receive said digitally modulated wave, said second channel including the following elements in series:

(A) a phase shifter for shifting the output carrier of said oscillator by 90°;

(B) a demodulator receiving said digitally modulated wave and receiving an output signal from said phase shifter and producing therefrom a quadrature phase demodulated signal Y_1;

(C) a low-pass filter coupled to receive said demodulated signal Y_1, and producing therefrom a filtered signal Y; and

(D) means for determining an error e_y, said means for determining including:

(I) means for producing a reconstructed signal Y from said filtered signal Y; and

(II) means for combining said reconstructed signal Y and said filtered signal Y to derive said error $e_y = Y - Y$;

(iv) a phase comparator coupled to receive said error e_x, said error e_y, said filtered signal X, said filtered signal Y, and a basic clock H which corresponds to a recovered symbol clock, said phase comparator producing a comparator signal S and a variable rate sampling clock which reproduces the basic clock H by eliminating certain edges, signal points being defined in said phase comparator on an imaginary plane which has an origin and orthogonal real and imaginary axes, said signal points being defined by pairs of in-phase and quadrature-phase values, idealized ones of said signal points being states of a signal constellation, which signal constellation represents said digitally modulated wave;

(v) a bistable trigger controlled by said sampling clock and coupled to receive said comparator signal S; and

(vi) an amplifying filter for producing the error signal $\epsilon(\phi)$ from an output of said bistable trigger;

(b) wherein the improvement comprises that said phase comparator includes:

(i) means for identifying some of said signal points using selection zones within said imaginary plane, said selection zones representing permissible in-phase and quadrature-phase limits for signal points which correspond to certain ones of a plurality of diagonal states, said diagonal states being those states of said signal constellation which have in-phase and quadrature phase values of equal absolute value, said selection zones being defined so that:

(A) none of at least one imaginary circle in said imaginary plane intersects said selection zones, each said imaginary circle being defined so that its center is at the origin of said imaginary plane and its circumference contains at least one said state of said signal constellation which is not a diagonal state; and

(B) said selection zones do not contain the axes of said imaginary plane;

(ii) means for generating said sampling clock by eliminating from said basic clock H all active edges capable of validating in said bistable trigger zero crossings of said comparator signal S which do not correspond to a phase difference equal to $2k\pi/M$, where k is an integer.

4,688,000

NON BIASED PUSH-PULL AMPLIFIERS

John S. Donovan, 18503 Santa Rosa, Detroit, Mich. 48221

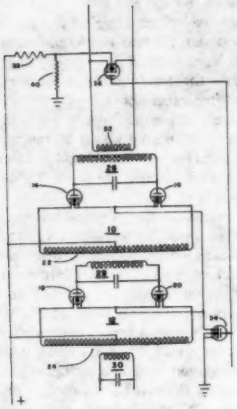
Continuation of Ser. No. 614,631, Jun. 29, 1984, abandoned, and Ser. No. 615,217, Jun. 29, 1984, abandoned. This application Mar. 7, 1985, Ser. No. 709,109

Int. Cl.[4] H03F *3/26*

U.S. Cl. 330—269 **14 Claims**

1. An amplifier comprising first and second transistors, each having a separate input electrode, a separate output electrode and a directly combined reference electrode, input means connecting the input electrodes of said first and second transis-

tors for deriving first input signals for said first transistor and second input signals of opposite phase for said second transistor from said input means to said transistors, separate output means connected between the output electrodes of said first and second transistors for combining first amplified signals



provided by said first transistor and second amplified signals provided by said second transistor to provide output signals for a push-pull stage, without biasing means utilizing depletion type Metal Oxide Semiconductor Field Effect Transistors.

4,688,001

HIGH EFFICIENCY, LOW DISTORTION AMPLIFIER

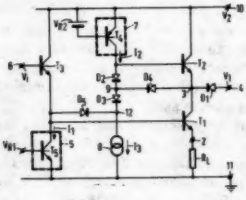
Eise C. Dijkmans; Joseph G. G. Raets, both of Eindhoven, Netherlands, and Norbert J. L. Philips, Louvain, Belgium, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 11, 1986, Ser. No. 838,966

Claims priority, application Netherlands, Mar. 18, 1985, 8500769

Int. Cl.[4] H03F *3/30*

U.S. Cl. 330—273 **16 Claims**



1. An amplifier arrangement, comprising

a first transistor having an emitter is coupled to a first terminal for connection to a load which is coupled to a reference point, and a collector is coupled by means of a first semiconductor junction to a second terminal for a first supply voltage,

a second transistor having a collector-emitter path connected in series with the collector-emitter path of the first transistor, and having a collector coupled to a third terminal for a second supply voltage which is higher than the first supply voltage, and

a third transistor arranged as an emitter-follower and having a base for receiving an input signal and having an emitter coupled to a base of the first transistor,

characterized in that

a current path is coupled between the third terminal and the reference point, and comprises a series arrangement of at least a first current source, a second semiconductor junction, a third semiconductor junction and a second current source,

a fourth semiconductor junction connects the collector of the first transistor to a point on the current path situated between the first current source and the second current source,

the emitter of the third transistor is connected to the second current source by means of a fifth semiconductor junction, and

the base of the second transistor is coupled to the first current source.

4,688,002

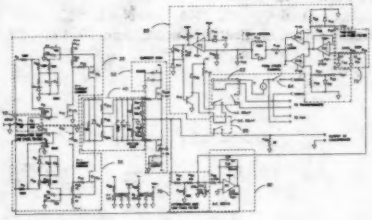
AUDIO POWER AMPLIFIER

Steven L. Wingate, 423-4th St. S.W., Hickory, N.C. 28602

Filed Mar. 28, 1986, Ser. No. 845,630

Int. Cl.[4] H02H *7/20;* **H03F** *3/30*

U.S. Cl. 330—298 **3 Claims**



1. An audio power amplifier comprising:

attenuator and low pass filter means for receiving an input signal, said attenuator and low pass filter means including MOSFET transistor means having a gate-to-source intrinsic capacitance employed as a low pass filter capacitor and being operative for limiting the bandwidth of the input signal, said attenuator and low pass filter means being further operative for limiting the voltage swing of the input signal;

complimentary current mirror and bias means coupled to said attenuator and low pass filter means for converting an input voltage signal to a current signal and for setting an output D.C. offset voltage;

voltage gain and bias means coupled to said complimentary current mirror and bias means for transforming said current signal into a large voltage signal;

class A current gain means coupled to said voltage gain and bias means for providing an output power signal;

loudspeaker means for receiving the output power signal from said class A current gain means;

D.C. relay means coupled between said class A current gain means and said loudspeaker means for selectively opening and closing connection between said class A current gain means and said loudspeaker means; and

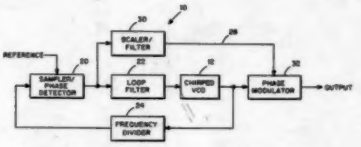
relay control means coupled to said D.C. relay means for sensing a threshold level of a D.C. component of said output power signal and for causing said D.C. relay means to open the connection between said class A current gain means and said loudspeaker means at such time as said threshold level is sensed to prevent damage to said loudspeaker means.

4,688,003

FEED-FORWARD ERROR CORRECTION FOR SANDAPS AND OTHER PHASE-LOCKED LOOPS

Chester E. Stromswold, Nashua, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed Oct. 3, 1986, Ser. No. 914,897
Int. Cl.[4] H03L 7/00
U.S. Cl. 331—25 6 Claims



1. For generating an apparatus output signal having a desired output phase relationship with a reference signal, an apparatus comprising:

A. a voltage-controlled oscillator, adapted for reception of a control signal, for generating a VCO output signal whose frequency is dependent upon the control signal;

B. an error detector for determining the deviation of the VCO output from a predetermined intermediate phase relationship with the received reference signal and for generating an error signal representing the deviation;

C. a loop filter connected to receive the error signal and apply a filtered version thereof as the control signal to the voltage-controlled oscillator so as to reduce the departure of the VCO output from the predetermined intermediate phase relationship with the received reference signal; and

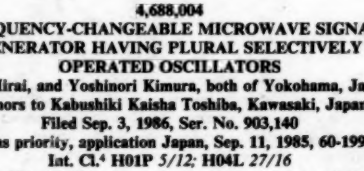
D. a phase-modulation circuit connected for reception of the error signal and the VCO output for generating an apparatus output whose phase relationship to the VCO output is modulated in accordance with the error signal such that the apparatus output bears substantially the desired output phase relationship to the reference signal when the error signal indicates that the VCO output bears the predetermined intermediate phase relationship to the reference signal and such that the phase relationship between the apparatus output and the VCO output changes to reduce the deviation of the apparatus output from the desired output phase relationship with the reference signal when the error signal indicates that the VCO does not bear the predetermined intermediate phase relationship to the reference signal.

4,688,004

FREQUENCY-CHANGEABLE MICROWAVE SIGNAL GENERATOR HAVING PLURAL SELECTIVELY OPERATED OSCILLATORS

Kenji Hirai, and Yoshinori Kimura, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 3, 1986, Ser. No. 903,140
Claims priority, application Japan, Sep. 11, 1985, 60-199519
Int. Cl.[4] H01P 5/12; H04L 27/16
U.S. Cl. 331—49 20 Claims



1. A frequency-changeable microwave signal generator comprising:

at least two microwave signal oscillating units;

a microwave signal transmission line having an output port;

at least two branch lines for respectively connecting said microwave signal oscillating units to said microwave signal transmission line, each of said branch lines having a length which is set at such a value to allow the impedance of said branch line measured from a connection point between said transmission line and said branch line to be substantially at maximum when said microwave signal oscillating unit connected to said branch line is in a state where it is not supplying a microwave signal thereto; and

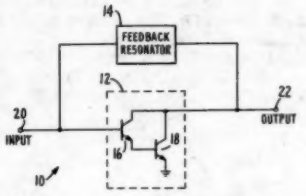
selective operating means for selectively operating any of said microwave signal oscillating units, so that a microwave signal is supplied from the operated microwave signal oscillating unit to said branch line.

4,688,005

SELF-OSCILLATING MIXER WITH DARLINGTON TRANSISTORS

Issy Kipnis, San Mateo, Calif., assignor to Avantek, Inc., Santa Clara, Calif.

Filed Apr. 1, 1986, Ser. No. 846,756
Int. Cl.[4] H03B 5/00, 5/18
U.S. Cl. 331—117 R 18 Claims



1. A self-oscillating mixer for receiving an input signal and for generating an output signal containing the frequency products of the input signal and a local-oscillator signal, said self-oscillating mixer comprising:

an input port for receiving the input signal;

an output port for supplying the output signal;

first and second bipolar transistors coupled as a Darlington pair, wherein the base of said first transistor is coupled to said input port, and wherein the common collectors of said transistors are coupled to said output port; and

a feedback loop operable for coupling signals at the local-oscillator frequency from said common collectors to said base of said first transistor.

4,688,006

PHASE COMPENSATED HYBRID COUPLER

Mon N. Wong, Torrance, and Wilbur J. Linhardt, Hawthorne, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Oct. 2, 1985, Ser. No. 782,677
Int. Cl.[4] H01P 5/18, 1/18
U.S. Cl. 333—113 8 Claims

1. A phase compensated waveguide hybrid coupler comprising:

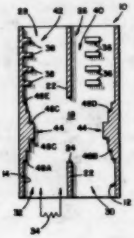
a first waveguide and a second waveguide;

means for coupling radiant energy between said first and second waveguide, said coupling means introducing a predetermined phase shift to radiant energy coupled by said coupling means from said first waveguide to said second waveguide;

a first phase shifter located in said first waveguide, said first phase shifter introducing a first compensatory phase shift having the same sign as said predetermined phase shift; and

second phase shifter located in said second waveguide, said second phase shifter introducing a second compensatory

phase shift opposite in sign to said predetermined phase shift, such that the algebraic sum of said predetermined phase shift and said second compensatory phase shift



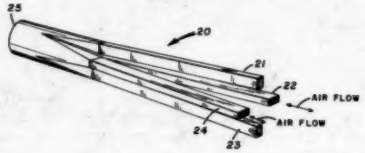
imparted to radiant energy in said second waveguide is equal to the amount of said first compensatory phase shift imparted to radiant energy in said first waveguide.

4,688,007

AIR INLET FOR INTERNAL COOLING OF OVERMODED WAVEGUIDE

Jerry A. Krill, Ellicott City, Md., assignor to The Johns Hopkins University, Baltimore, Md.

Filed Sep. 3, 1985, Ser. No. 771,922
Int. Cl.[4] H01P *1/00*; H03H *7/48*
U.S. Cl. 333—137 **13 Claims**



12. In a waveguide system including at least one overmoded waveguide, the improvement for air cooling said overmoded waveguide structure and comprising,

a cooling air flow, and

an air inlet/outlet means for connecting said cooling air flow to and from the inside of said overmoded waveguide,

said waveguide system including at least one circular overmoded waveguide, at least two rectangular waveguides, and at least one transition structure for interconnecting said circular and rectangular waveguides, said transition structure having a circular end portion for connecting to said circular overmoded waveguide and a plurality of interconnected rectangular leg portions, at least two of said rectangular leg portions being connected to respective rectangular waveguides and the remainder of said rectangular leg portions of said transition structure comprising said air inlet/outlet means and each having a metallic screen connected across its extending end and being connected to said cooling air flow.

4,688,008

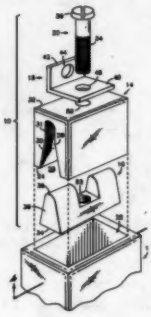
LOCKING, ADJUSTABLE WAVEGUIDE SHORTING PISTON

David R. Pollard, South Lake Tahoe, Calif., and Robert H. Goldbach, Litchfield Park, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 3, 1986, Ser. No. 825,179
Int. Cl.[4] H01P *1/28*
U.S. Cl. 333—253 **12 Claims**

1. A waveguide shorting piston installed in a waveguide having a predetermined cross-sectional shape, the piston comprising:

a block having a base, a cross-sectional shape substantially corresponding to the cross-sectional shape of the waveguide, and a channel extending into said block from the base of said block;



a wedge receivable in the channel of said block and shaped to cause the base of said block to expand when said wedge is received in the channel of said block; and

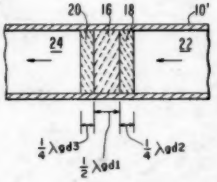
means for fastening said wedge within the channel of said block, said fastening means being coupled to said block and to said wedge.

4,688,009

TRIPLE-PANE WAVEGUIDE WINDOW

Patrick E. Ferguson, and Andrew L. Nordquist, both of Mountain View, Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.

Filed May 13, 1985, Ser. No. 733,430
Int. Cl.[4] H01P *1/08*
U.S. Cl. 333—252 **8 Claims**



2. A waveguide window comprising:

a section of hollow waveguide adapted to transmit a wave which possesses a transverse electric field perpendicular to the direction of propagation of said wave;

a first pane of dielectric possessing a first dielectric constant and a first pair of parallel surfaces spaced apart substantially an integral number of half-wavelengths of said wave disposed across an open cross-section of said waveguide with said first pair of parallel surfaces perpendicular to the direction of propagation of said wave;

a second pane of dielectric possessing a second dielectric constant substantially lower than said first dielectric constant and a second pair of parallel surfaces spaced apart substantially an odd number of quarter-wavelengths of said wave disposed substantially across said open cross-section with one of said second pair of parallel surfaces adjacent one of said first pair of parallel surfaces; and

a third pane of dielectric possessing a third dielectric constant substantially lower than said first dielectric constant and a third pair of parallel surfaces spaced apart substan-

tially an odd number of quarter-wavelengths of said wave disposed substantially across said open cross-section with one of said third pair of parallel surfaces adjacent the other of said first pair of parallel surfaces.

4,688,010

ELECTROMAGNETIC RELAY

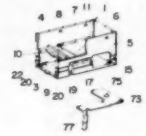
Kazuhiro Nobutoki; Kenji Ono, both of Matsusaka; Keiji Okahashi, Ise, and Sueyoshi Matsumura, Mie, all of Japan, assignors to Matsushita Electric Works, Ltd., Japan

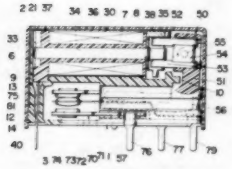
Filed Nov. 21, 1985, Ser. No. 800,393

Claims priority, application Japan, Dec. 22, 1984, 59-271529; Dec. 24, 1984, 59-278585

Int. Cl.[4] H01H *67/02*

U.S. Cl. 335—128 **7 Claims**





1. An electromagnetic relay comprising:

a casing of electrically insulative material having a bottom wall having lateral sides, opposed side walls having longitudinal ends, said side walls extending upwardly from the lateral sides thereof, an end wall extending upwardly from one of said longitudinal ends of the bottom wall and joining said side walls at its lateral ends;

an insulation partition extending from said end wall in generally parallel relation to the bottom wall between the opposed side walls so as to define a coil space thereabove and a switching space therebelow;

said bottom wall, side walls, end wall and insulation partition being integrally formed of insulative material;

an electromagnet having a length defined by two longitudinal ends, said electromagnet being received within said coil space and having a winding with a longitudinal axis extending horizontally along said partition;

a contact assembly received within said switching space with its switching contact portion located in close proximity to said end wall and including at least one movable contact;

an armature which is disposed adjacent the longitudinal end of the electromagnet remote from said end wall to be magnetically coupled thereto and which is operatively connected to said contact assembly for switching operation thereof in response to the energization of the electromagnet;

said partition extending along the entire length of the electromagnet without leaving any communication path between the coil space and the switching space so as to completely separate the coil space from the switching space along the length of the electromagnet;

said partition terminating at an edge, which edge is recessed with respect to the longitudinal ends of the side walls remote from the end wall to define thereat a recess through which the coil space and the switching space are intercommunicated; and

said armature having a card of electrically insulative material which extends through said recess into the switching space where it is connected to the movable contact of the contact assembly.

4,688,011

MOTOR SAFETY SWITCH

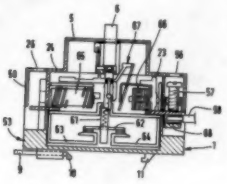
Helmut Lemmer, Marienheide-Kalsbach, and Josef Risthaus, Dorsten, both of Fed. Rep. of Germany, assignors to Square D Starkstrom GmbH, Marienheide-Kalsbach, Fed. Rep. of Germany

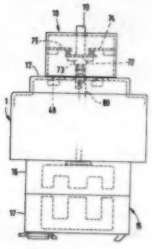
Filed Dec. 16, 1985, Ser. No. 809,195

Claims priority, application European Pat. Off., Dec. 18, 1984, 84115679

Int. Cl.[4] H01H *9/00*

U.S. Cl. 335—159 **15 Claims**





1. A motor safety switch comprising:

a plurality of assembled independent components;

a first of said components including a switch unit having a contact system, a thermal tripper and magnetic tripper; said contact system including a plurality of contact strips, a contact strip holder common to all of said contact strips, lever means separately operated by said thermal tripper and said magnetic tripper for operating said contact strip holder;

a second of said components being an electromagnetic drive unit;

a third of said components being a modular contact unit; and

means for maintaining said components in assembled stacked relationship to each other generally normal to an associated mounting plane with all components in electrical and mechanical operative relationship.

4,688,012

ELECTROMAGNETIC ACTUATOR MECHANISM IN PARTICULAR FOR PRINT HAMMER DRIVES

Armin Bohg, Weil-Neuweiler; Ludwig Fischer, Herrenberg-Kuppingen; Bruno Gantz, Herrenberg; Kurt Hartmann, Calw-Heumaden, and Gerhard Wolfert, Stuttgart, all of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 22, 1986, Ser. No. 909,989

Int. Cl.[4] H01F *7/08*

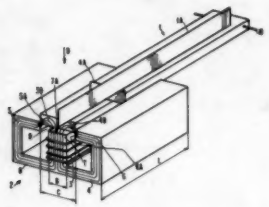
U.S. Cl. 335—276 **6 Claims**

1. Electromagnetic actuator mechanism for switching,

stroke and impact motions, comprising a clapper armature and an electromagnet consisting of an excitation coil and a magnetizable yoke structure, wherein the clapper armature is attracted by the yoke structure upon excitation of the electromagnet, characterized in that

the motional plane of the clapper armature extends perpendicularly to the plane of the magnetic flux of the yoke structure of the electromagnet,

the yoke structure, viewed in the magnetic flux plane, has a substantially E-shaped cross-section with two outer legs and one center leg and a base common to all legs, wherein the pole face of the center leg, encompassed by the excitation coil, faces the clapper armature, and the free ends of



the outer legs are so bent in a direction towards each other that a magnetic operating gap is formed between their pole faces, outside or inside of which the pole face of the center leg is positioned,

upon excitation of the electromagnet, the clapper armature is pulled inside the operating gap, being increasingly attracted by the pole face of the center leg, with substantially half of the magnetic flux of the center leg passing across the clapper armature to one pole face of the operating gap, and

the length of the clapper armature between its pivotal axis and the operating gap is more than twice the width of the clapper armature between the pole faces of the operating gap.

4,688,013

SWITCHGEAR ASSEMBLY FOR ELECTRICAL APPARATUS

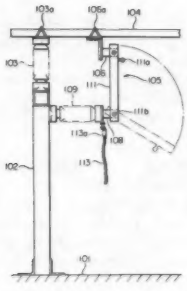
Akira Nishikawa, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed May 7, 1986, Ser. No. 860,588

Claims priority, application Japan, May 9, 1985, 60-96701; Jun. 3, 1985, 60-118858

Int. Cl.[4] H01H *71/10*

U.S. Cl. 337—168 **9 Claims**



1. A switchgear assembly for connecting and disconnecting electrical power from a source to an electrical apparatus comprising:

a bus bar for carrying electrical power from the source;

a vertical pole carrying a first vertical support insulator for supporting said bus bar and a second horizontal support insulator;

a movable contact having an upper end and a lower end;

means solely connected to said bus bar and completely independent of said pole for holding the upper end of said movable contact connected to and in fixed position on said bus bar; and

means on said second support insulator mounted on said pole pivotally supporting the lower end of said movable contact for rotary motion in a vertical plane from a release position where the upper end of said movable contact is physically and electrically disconnected from said bus bar and a connected position where the upper end of said movable contact is held by said holding means connected to and in fixed position on said bus bar.

4,688,014

SEMICONDUCTOR TYPE GAS SENSOR HAVING TWO TERMINALS

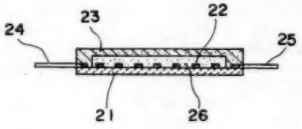
Hisao Kitaguchi, Toyonaka, Japan, assignor to New Cosmos Electric Co., Ltd., Japan

Continuation-in-part of Ser. No. 582,512, Feb. 22, 1984, abandoned. This application Jun. 28, 1985, Ser. No. 750,226

Claims priority, application Japan, Apr. 11, 1983, 58-62075

Int. Cl.[4] H01L *7/00*

U.S. Cl. 338—34 **4 Claims**



1. A gas sensor having two terminals and comprising:

a heater having a positive temperature coefficient of resistance, and

a gas sensitive semiconductor covering the heater at least at their opposite ends and having a negative temperature coefficient of resistance,

the heater being an alloy composed of a principal ingredient and an auxiliary ingredient, the principal ingredient being platinum,

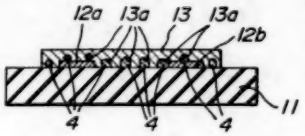
the semiconductor being a sintered metal oxide composed of a principal ingredient and an auxiliary ingredient, the principal ingredient being tin oxide,

wherein the kinds and contents of the auxiliary ingredients in the alloy and the sintered metal oxide are so selected that a combined resistance of said heater and said semiconductor are substantially constant corresponding to an offset of the temperature coefficient of resistance of the heater to the temperature coefficient of resistance of the semiconductor at operating temperatures, and wherein the auxiliary ingredient of the alloy is about 2 to 13 weight percent of rhodium and the auxiliary ingredient of the sintered metal oxide is about 0.01 to 0.10 atomic ratio percent of antimony pentoxide, the atomic ratio being based on the number of tin atoms and antimony atoms.

4,688,015
GAS SENSOR WITH CERAMICS SUBSTRATE HAVING SURFACE-CARRIED CERAMICS PARTICLES

Takao Kojima, Nagoya; Akira Nakano, Inuyama; Toshitaka Matsuura, Komaki, and Akio Takami, Konan, all of Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Oct. 25, 1984, Ser. No. 664,872
Claims priority, application Japan, Oct. 28, 1983, 58-203222; Mar. 28, 1984, 59-60048; Sep. 4, 1984, 59-183818
Int. Cl.[4] H01L *7/00*
U.S. Cl. 338—34 3 Claims

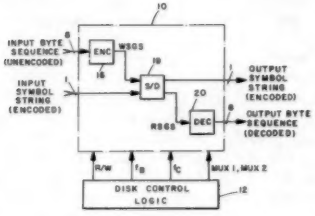


1. A gas sensor comprising an electrically insulating substrate made of sintered ceramics, thick film electrodes formed on a surface of said substrate, sintered ceramics particles scattered onto, integrally bonded to and extending outwardly from the surface of said substrate in the vicinity of said thick film electrodes, said sintered ceramics particles having a granulated mean diameter of at least 5 μm and a granulated maximum diameter of not larger than 500 μm before being sintered, and a sensor element in the form of a thick film firmly bonded to the surface of said substrate through said scattered ceramics particles, to said thick film electrodes to be electrically connected therewith, and to said scattered ceramics particles.

4,688,016
BYTE-WIDE ENCODER AND DECODER SYSTEM FOR RLL (1,7) CODE

Wilson W. Fok, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 13, 1985, Ser. No. 745,242
Int. Cl.[4] H03M *7/28*
U.S. Cl. 340—347 DD 13 Claims



1. A system for encoding an input byte-wide data stream into an output run-length-limited (RLL) symbol string or for decoding an output byte-wide data stream from an input RLL symbol string, comprising:

RLL encoder means responsive to consecutive, unencoded parallel bytes occurring at a byte rate f_B in an input byte-wide data stream for producing a first RLL (1,7) symbol sequence including consecutive groups of parallel RLL symbols, each of said bytes including at least eight bits;

format means responsive to a mode control signal and connected to said RLL encoder means for operating in a first mode by receiving said first RLL symbol sequence at said byte rate f_B and converting said first RLL (1,7) symbol sequence into an output RLL symbol string having a symbol string rate $f_C = N \times f_B$, where N is a whole number which is greater than 1, or for operating in a second mode by receiving an input RLL symbol string having said symbol string rate f_C and providing, at said byte rate, a second RLL (1,7) symbol sequence including consecutive groups of parallel RLL symbols;

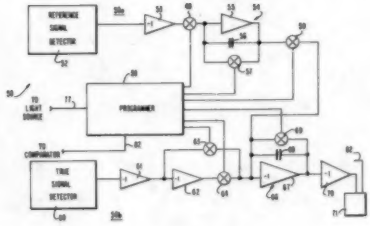
RLL decoder means responsive to said second RLL (1,7) symbol sequence for providing an output byte-wide data stream including consecutive, decoded parallel bytes of data occurring at said byte rate f_B, each of said decoded bytes comprising at least eight bits; and

mode control means for conditioning said mode control signal to operate said format means in either said first mode or said second mode according to a predetermined external condition.

4,688,017
OPTICAL DETECTOR CIRCUIT FOR PHOTOMETRIC INSTRUMENT

Victor R. Huebner, Newtown Square, and Scott K. Hartman, Philadelphia, both of Pa., assignors to CooperBiomedical, Inc., Malvern, Pa.

Filed May 20, 1986, Ser. No. 864,852
Int. Cl.[4] H03M *1/52*
U.S. Cl. 340—347 NT 13 Claims



8. In an apparatus for converting a reference analog signal and a true analog signal into a digital representation indicative of said true signal of the type including a reference detection means for detecting a reference signal, and a true signal detection means for detecting a true signal, and an output circuit for providing a digital representation of the magnitude of said true analog signal relative to said reference signal, the improvement comprising:

a reference signal integration means for integrating said reference analog signal upon command;

a true signal integration means for integrating said true analog signal on command; and

program means for commanding the operation of said reference signal integration means and said true signal integration means (a) during a discharge cycle in which charge stored on either of said integration means is discharged to a reference level; (b) during a measuring cycle in which said reference signal integration means integrates the reference analog signal while said true signal integration means integrates said true analog signal; and (c) during a de-integration cycle wherein said reference signal integration means de-integrates the signal obtained during said measuring cycle on said true analog signal detector.

4,688,018
MULTIFUNCTION ANALOG-TO-DIGITAL SUCCESSIVE APPROXIMATION REGISTER

Herchel A. Vaughn, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 16, 1985, Ser. No. 776,312
Int. Cl.[4] H03M *1/38*
U.S. Cl. 340—347 AD 9 Claims

1. In a successive approximation-type analog-to-digital converter, a successive approximation register comprising:

a shift register having an input and a plurality of outputs and being adapted to respond to a clock signal; and

a plurality of successive approximation bit cells each comprising:

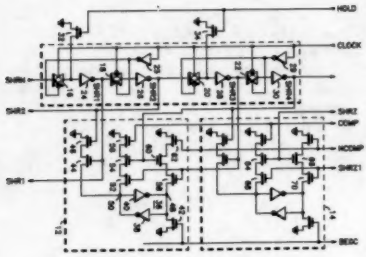
a latch capable of assuming first and second stable states;

first means coupled to at least one output of said shift register for responding to said output by placing said latch in one of said first and second stable states at a first time predetermined with respect to said clock signal, said first means being incapable of altering the state of said latch in response to said at least one output while said input of said shift register is in a first predetermined state regardless of said clock signal;

second means coupled to at least one output of said shift register different from said at least one output to which said first means is coupled and coupled to at least one comparison signal for responding to said at least one output and said at least one comparison signal by altering the state of said latch at a second time predetermined with respect to said clock signal; and wherein said second means further comprises:

third means for altering the state of said latch; and

fourth means for enhancing the state of said latch.



4,688,019

SIGNAL TRANSMISSION SYSTEM

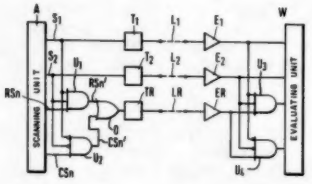
Walter Schmitt, Traunreut, Fed. Rep. of Germany, assignor to Johannes Heidenhain GmbH, Traunreut, Fed. Rep. of Germany

Filed Oct. 5, 1984, Ser. No. 658,112

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1983, 3337653

Int. Cl.[4] G08C *9/06*

U.S. Cl. 340—347 P **7 Claims**



6. A method for transmitting signals in a length or angle measuring instrument, the instrument comprising a measuring graduation, a plurality of identical reference marks associated with the graduation, a plurality of code marks associated with the reference marks, a scanning unit, at least a first signal line on which a periodic signal with first and second signal states is transmitted, the periodic signal generated by the scanning unit in response to scanning of the graduation, at least a second signal line, at least first and second nonperiodic signals, the first nonperiodic signal generated by the scanning unit in response to scanning of the reference marks, the second nonperiodic signal generated by the scanning unit in response to scanning of the code marks, said method comprising the following steps:

transmitting the first nonperiodic signal via the second signal line when the periodic signal is in the first signal state; and

transmitting the second nonperiodic signal via the second signal line when the periodic signal is in the second signal state;

thereby transmitting both the first and second nonperiodic signals on the second signal line.

4,688,020

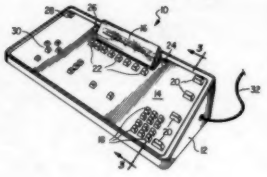
RECONFIGURABLE KEYBOARD

Gary Kuehneman, Plano, and Joel Leavitt, Carrollton, both of Tex., assignors to United States Data Corporation, Richardson, Tex.

Filed May 14, 1984, Ser. No. 609,961

Int. Cl.[4] G08C *9/00*

U.S. Cl. 340—365 VL **35 Claims**



1. A reconfigurable keyboard for interface with a host device, comprising:

a keyboard matrix of predefined locations;

means for defining the function of each of said predefined locations according to a matrix table;

key selection means for allowing an operator to select at least one of said predefined locations and the function associated therewith;

means for allowing the operator to physically select ones of said predefined locations and for inhibiting a function associated therewith from being carried out;

means for altering said matrix table to redefine the function of each of said predefined locations;

means for outputting command signals to the host device as a function of key selection and the function associated therewith as defined in said matrix table; and

means for inhibiting access to ones of said predefined locations by said selection means, said inhibit means comprising a panel with an area having a perimeter perforation overlying each said predefined location, said area being adapted for removal to thereby allow access to desired ones of said predefined locations.

4,688,021

COMBINED SMOKE AND GAS DETECTION APPARATUS

Robert H. Buck; Kent G. Cowan; John P. Doughty, all of Midland, and Stephen E. Marshall, Lubbock, all of Tex., assignors to BDC Electronics, Midland, Tex.

Filed Mar. 11, 1986, Ser. No. 838,469

Int. Cl.[4] G08B *19/00, 17/10*

U.S. Cl. 340—521 **3 Claims**

1. A combined smoke and gas detector, comprising:

a smoke sensor for sensing the presence of smoke and out-

putting a smoke level signal indicative of the level of the smoke presence;

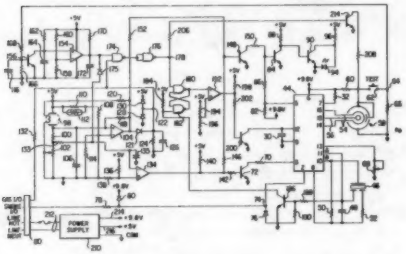
a gas detector for sensing the presence of gas and outputting a gas level signal indicative of the level of the gas smoke present, said gas sensor comprising an internal heating element requiring a predetermined amount of time to heat up before accurate gas detection can be made;

smoke detection means for receiving the smoke level signal from said smoke sensor and comparing it with a predetermined smoke threshold and outputting a smoke present signal when the smoke level signal exceeds the smoke threshold;

gas detection means for receiving the gas level signal and comparing it with a predetermined gas threshold and outputting a gas present signal when the gas level signal exceeds the gas threshold;

delay means for delaying the output of said gas detect signal from said gas detection means for a predetermined amount of time to allow said heating element in said gas detector to heat up when the combined smoke and gas detector is activated to prevent a false alarm;

a piezoelectric crystal for providing an audible output tone;



means for modulating said piezoelectric crystal to output a plurality of distinguishable audio output signal, said modulating means turning said piezoelectric crystal on and off at different rates;

a light emitting diode for providing a visual output;

means for controlling said light emitting diode to turn said light emitting diode on and off at a predetermined rate to provide a plurality of distinguishable visual output signals;

means for transmitting said smoke and gas present signals to a remotely disposed smoke and gas detector;

means for receiving a remotely generated gas and smoke present signal from a remotely disposed smoke and gas detector; and

control means for receiving said smoke and gas present signals and said remotely generated gas and smoke present signals and controlling said modulating means for said piezoelectric crystal and said light emitting diode to provide a distinguishable audio and visual output for gas present locally alone, smoke present locally alone, combined gas and smoke present locally, remote gas present and remote smoke present, said audio and visual output allowing a user to distinguish between the various combinations of gas present, smoke present, remote gas present and remote smoke present.

4,688,022

SAFETY DEVICE FOR HANG GLIDER

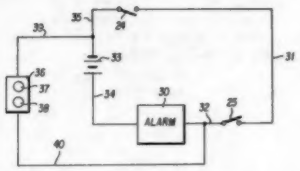
John R. Gray, 3009 Cyrandall Valley Rd., Oakton, Va. 22124

Filed Feb. 6, 1986, Ser. No. 826,741
Int. Cl.[4] G08B *21/00*; B64D *17/00*
U.S. Cl. 340—540 **20 Claims**

1. An alarm device for a hang glider, said glider having a keel and having a hook-up strap attached to said keel, said hook-up strap having a free end adapted for connection to the harness of a glider pilot, comprising:

a position sensor mounted to the keel of said glider, said sensor adapted to complete an electrical circuit when the glider is positioned in a take-off attitude;

a second sensor arranged in series with said position sensor, said second sensor adapted to complete an electrical circuit when the free end of said hook-up strap is disconnected from the harness of said glider pilot; and



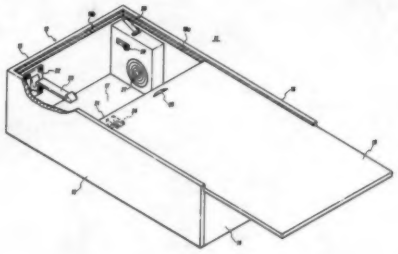
alarm means adapted to alert the pilot upon completion of an electrical circuit by both said position sensor and said second sensor.

4,688,023

CONTAINER HAVING CHILD SAFETY DEVICE AND ALARM

Stephen T. McGill, and Bette L. McGill, both of La Grange, Tex., assignors to Stephen C. Highsmith, La Grange, Tex.

Filed Aug. 19, 1985, Ser. No. 766,809
Int. Cl.[4] G08B *13/08*
U.S. Cl. 340—545 **6 Claims**



1. A container comprising:

a housing having first and second oppositely positioned end walls, a pair of side walls, a bottom member and an open top forming an enclosure, said housing having a substantially rectangular shape;

a cover member which is movable between a first position at which said enclosure is substantially completely closed to prevent access to items stored therein and a second position at which said enclosure is substantially completely open to allow access to said items, said cover member being slidable along an axis extending between said first and second oppositely positioned end walls of said housing;

latch means for preventing the cover member from being moved beyond a first predetermined non-zero distance from said first position when said latch means is engaged, said latch means including an arm member attached at a first end thereof to an inner surface of the first end wall, said arm member having a first detent member on a second end thereof, opposite from said first end, and a stop member attached to an inner surface of said cover member, said stop member having a second detent member for engaging said first detent member when said cover member is moved said first predetermined distance from said first position, thereby preventing further movement of said

cover member until said first and second detent members are disengaged;

activatable alarm means for providing a real-time indication that said cover member is beyond a second predetermined non-zero distance from said first position;

means responsive to the movement of said cover member beyond said second predetermined distance from said first position for activating said alarm means; and,

user operable means for selectively enabling said alarm means to be activated by said activating means and for selectively disabling said alarm means from being activated by said activating means.

4,688,024

BARRIER ARRANGEMENT AND A METHOD FOR PRODUCING THE SAME

Villy Gadde, Västervik, Sweden, assignor to Safe Bridge AB, Vastervik, Sweden

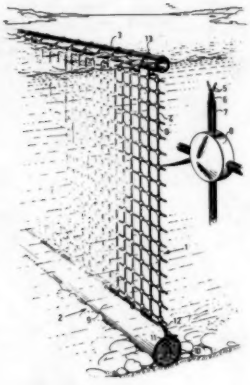
PCT No. PCT/SE86/00188, § 371 Date Nov. 19, 1986, § 102(e) Date Nov. 19, 1986, PCT Pub. No. WO86/06465, PCT Pub. Date Nov. 6, 1986

PCT Filed Apr. 23, 1986, Ser. No. 940,813

Claims priority, application Sweden, Apr. 24, 1985, 8501996

Int. Cl.[4] G08B *13/00*

U.S. Cl. 340—550 **6 Claims**



1. A barrier arrangement for blocking a water passage or channel against the admission of foreign or unfamiliar objects, such as underwater vessels, frogmen and the like, comprising a net (1) of extremely high tensile strength intended to be stretched across the passage or channel, and in which arrangement the net comprises lines (4) which incorporate electrical conductors (5) which are insulated from the surroundings and through which a close circuit current is intended to flow; in which the bottom edge of the net (1) is anchored to the sea-bed and the net arranged to be activated from a passive state, in which the net may rest against the sea-bed, to an active barrier state, to which end the net (1) is connected along its upper edge to an inflatable and deflatable lifting hose (3) which in its evacuated state is essentially flat and which when inflated is able to lift the upper edge of the net to the surface of the water, so as to stretch the net between the sea-bed and said surface, characterized in that the upper and lower edges of the net (1) are respectively braided to anchoring bodies (9) located on the sea-bed and to the lifting hose (3) with the aid of lines (12; 13) which incorporate electrical conductors which are insulated from the surroundings and through which a close circuit current is intended to flow; and in that the conductors are connected to an alarm device, to which the conductors (5) incorporated in the lines (4) forming said net are also connected; and in that the alarm unit is arranged to be activated on the occurrence of an earth fault or a short circuit in any of the connected conductors.

4,688,025

MOVEMENT SENSOR

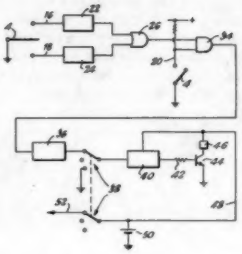
Peter Frank, London, England, assignor to Product Innovation Limited, London, England

Filed Nov. 5, 1984, Ser. No. 668,260

Claims priority, application United Kingdom, Nov. 4, 1983, 8329532; Sep. 10, 1984, 8422802

Int. Cl.[4] G08B *13/14*

U.S. Cl. 340—571 **13 Claims**



8. A movement sensor comprising:

a movable part, said movable part being capable of adopting a first position and a second position, said first and second positions being spaced from each other;

detection means, said detection means providing a first detection signal when said movable part is in said first position and a second detection signal when said part is in said second position; and

alarm signal generating means, said generating means being coupled to said detection means and being arranged to generate an alarm signal in response to (a) receipt of said first detection signal followed by said second detection signal, or (b) receipt of said second detection signal followed by said first detection signal.

4,688,026

METHOD OF COLLECTING AND USING DATA ASSOCIATED WITH TAGGED OBJECTS

James R. Scribner, 7694 Parkwood Ct., Waterford, Mich. 48095; Thomas G. Brown, 6410 Woodland, Utica, Mich. 48087, and Anthony Caracciolo, Jr., 1756 Welling, Troy, Mich. 48098

Continuation-in-part of Ser. No. 610,612, May 15, 1984, abandoned. This application Apr. 21, 1986, Ser. No. 854,152

Int. Cl.[4] H04Q *1/00*

U.S. Cl. 340—572 **12 Claims**

1. A method of conducting an inventory of objects within a predefined space associated with a fixed structure, comprising:

defining an association between said predefined space and said objects;

storing data which defines said association in at least one location tag being capable of wireless transmission of a location code indicative of said data and mounting said location tag to a fixed structure associated with said predefined space;

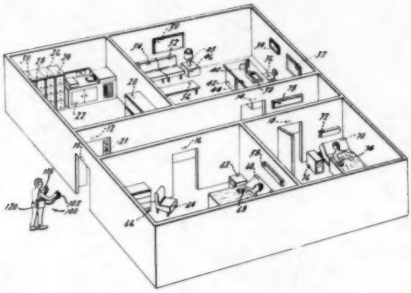
for each object to be inventoried, using at least one identification tag being capable of wireless transmission of an identification code indicative of said object and mounting said identification tag to each object to be inventoried;

using a portable unit having noncontacting means for receiving and storing said location codes indicative of said data and said identification codes;

transporting said portable unit to the vicinity of said fixed structure to thereby receive and store said location code

produced by said location tag on said fixed structure and to thereby download said data into said portable unit;

transporting said portable unit to the vicinity of at least one of said objects within said predefined space to thereby



receive and store said identification code produced by said identification tag on said one of said objects; and

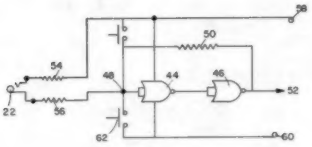
comparing said downloaded data and said stored identification code in said portable unit to thereby conduct said inventory.

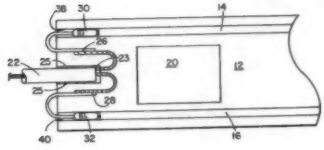
4,688,027

ISOLATED MOLDED SENSOR STRIP

M. W. Widener, 703 Westbrook Dr., Austin, Tex. 78746

Filed Nov. 4, 1985, Ser. No. 794,714
Int. Cl.[4] G08B *21/00*; H01H *29/00*
U.S. Cl. 340—604 **4 Claims**





1. An isolated molded sensor strip comprising:

A. an extruded, flexible, electrically insulating sensor strip with a pair of oppositely positioned retaining grooves formed therein;

B. a pair of oppositely positioned non-metallic conductors fusedly secured to said sensor inserted into said oppositely positioned retaining grooves and fusedly secured therein by the application of heat and pressure so that a solid, smooth surface without grooves is provided;

C. an isolating yoke means which ensures complete electrical isolation of said pair of non-metallic conductors by means of an opening in said thin, flexible extruded sensor strip between said pair of non-metallic conductors;

D. said yoke means which seals the ends of said pair of non-metallic conductors so that a joint between said yoke and said sensor strip provides a non-continuous path around said opening between said pair of non-metallic conductors;

E. a connection between both of said oppositely positioned non-metallic conductors and a pair of isolation resistors, each with two leads extending therefrom, by insertion of one pair of said leads from said isolation resistors into said non-metallic conductors;

F. a connection of said pair of isolation resistors with one end of said shielded wire transmission means by joining the other pair of said leads from said isolation resistors to one end of said shielded wire transmission means;

G. a total sealing of said shielded wire transmission means and said isolation resistors by said isolating yoke means by way of being pressure formed around said connection of said resistors and said transmission means at the place where said transmission means passes out of said yoke means; and

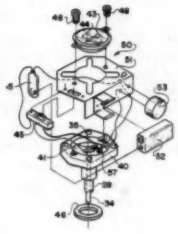
H. an electronic transmission plug attached to the opposite end of said shielded transmission means so that said transmission plug may be connected to a detection alarm system so that the presence of said electrical signals is detected.

4,688,028

AUDIBLE LOW-FUEL ALARM FOR PROPANE FUEL TANK

Sidney H. Conn, 139 N. Mulberry St., Statesville, N.C. 28677

Filed Dec. 4, 1985, Ser. No. 804,526
Int. Cl.[4] G01F *23/12*
U.S. Cl. 340—625 **8 Claims**



1. An audible low-fluid alarm for a fluid reservoir, comprising:

(a) float means disposed within the fluid reservoir and movable within a predetermined range of travel responsive to the level of fluid within said reservoir;

(b) a driver magnet rotatably mounted within said reservoir for rotational movement responsive to movement of said float means to define a magnetic field having a direction corresponding to a particular level of fluid within the reservoir;

(c) sensor means exterior to said reservoir for detecting the magnetic field when in the direction corresponding to a particular level of liquid within the reservoir and outputting an electrical signal;

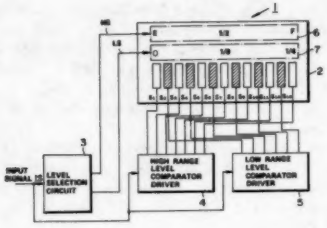
(d) a driven magnet positioned in spaced-apart relation to said driver magnet and exterior to said reservoir, said sensor means being positioned between said driver magnet and said driven magnet in magnetic field sensing relation to both said magnets for providing a redundant sensing capability; and

(e) audible alarm means connected to said sensor for activation by said electrical signal output from said sensor means.

4,688,029
ANALOG DISPLAY DEVICE

Hiroaki Kawasaki, and Nobumitsu Kanetsuna, both of Mobara, Japan, assignors to Futaba Denshi Kogyo Kabushiki Kaisha, Mobara, Japan

Filed Jun. 21, 1984, Ser. No. 622,875
Claims priority, application Japan, Jun. 30, 1983, 58-100107[U]
Int. Cl.⁴ G01F *23/24;* G09G *3/00*
U.S. Cl. 340—754 **13 Claims**



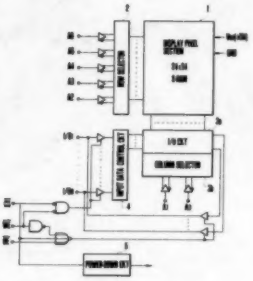
1. An analog display device comprising:
a plurality of range scales each being capable of independent illumination;
a level display section having a plurality of high range display segments for indicating the remaining amount of the quantity being measured as a fraction between the maximum measurable amount of the quantity being measured a predetermined amount less than the maximum measurable amount of the quantity being measured and a plurality of low range display segments for indicating the remaining amount of the quantity being measured as a fraction between zero and the predetermined amount, said high and low range display segments being interspersed alternately arranged and in parallel to one another;
a level selection circuit for generating a high level signal when the magnitude of the quantity being measured is above the predetermined amount and for generating a low level signal when the magnitude of the quantity being measured is decreased below the predetermined amount and for selectively illuminating one of said range scales in response to said high level and low level signals;
a high range level comparator driver connected to each of said high range display segments for selectively illuminating said high range display segments depending upon the remaining amount of the quantity being measured:
a low range level comparator driver connected to each of said low range display segments for selectively illuminating said low range display segments depending upon the remaining amount of the quantity being measured; and
a range display section connected to said level selection circuit for indicating whether the remaining amount of the quantity being measured is above or below the predetermined amount.

4,688,030
FLUORESCENT DISPLAY DEVICE

Sashiro Uemura, and Motoo Iwade, both of Mie, Japan, assignors to ISE Electronics Corporation, Ise, Japan

Filed Aug. 23, 1984, Ser. No. 844,181
Claims priority, application Japan, Aug. 26, 1983, 58-155888
Int. Cl.⁴ G09G *3/30*
U.S. Cl. 340—781 **10 Claims**

1. A flourescent display device having:
an integrated semiconductor substrate formed thereon with a light emitting display section for emitting light from phosphor formed on a screen electrode and a drive section for controlling said light emitting display section; a cathode opposing said light emitting display section; and a vacuum chamber which has at least one light-transmitting surface for forming a display surface and hermetically sealing said semi-conductor substrate and said cathode;
said light-emitting display section comprising a plurality of light-emitting elements arranged in a matrix form, each of said light emitting elements comprising a static random

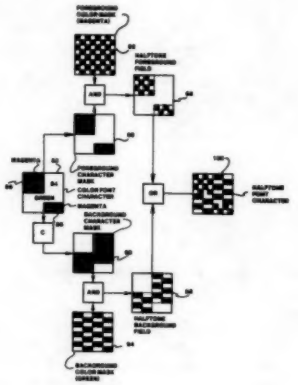


access memory including a flip-flop which has output terminals Q and $\overline{Q}$, a drive transistor which has a first terminal coupled to one of said output terminals Q and $\overline{Q}$, a second terminal coupled to said screen electrode, and a third terminal coupled to a power source.

4,688,031
MONOCHROMATIC REPRESENTATION OF COLOR IMAGES

William T. Haggerty, Groton, Mass., assignor to Wang Laboratories, Inc., Lowell, Mass.

Filed Mar. 30, 1984, Ser. No. 595,027
Int. Cl.⁴ G09G *3/00*
U.S. Cl. 340—793 **8 Claims**



1. A method for transforming a color image into a monochromatic image, the color image being comprised of a plurality of areas each having a color, comprising the steps of:
(A) providing a plurality of color pattern masks, each color pattern mask being associated with a color, and each color pattern mask representing a dot pattern comprised of a rectangular array of light and dark dots as follows
(1) in a mask for the color black
i. the even numbered rows of the array are comprised of one or more repetitions of the dot pattern 0000 and

ii. the odd numbered rows of the array are comprised of one or more repetitions of the dot pattern 0000,

(2) in a mask for the color red

i. the even numbered rows of the array are comprised of one or more repetitions of the dot pattern 1011 and

ii. the odd numbered rows of the array are comprised of one or more repetitions of the dot pattern 1110,

(3) in a mask for the color green

i. the even numbered rows of the array are comprised of one or more repetitions of the dot pattern 1100 and

ii. the odd numbered rows of the array are comprised of one or more repetitions of the dot pattern 0011,

(4) in a mask for the color yellow

i. the even numbered rows of the array are comprised of one or more repetitions of the dot pattern 1100 and

ii. the odd numbered rows of the array are comprised of one or more repetitions of the dot pattern 0000,

(5) in a mask for the color blue

i. the even numbered rows of the array are comprised of one or more repetitions of the dot pattern 1111 and

ii. the odd numbered rows of the array are comprised of one or more repetitions of the dot pattern 1111,

(6) in a mask for the color magenta

i. the even numbered rows of the array are comprised of one or more repetitions of the dot pattern 1010 and

ii. the odd numbered rows of the array are comprised of one or more repetitions of the dot pattern 0101,

(7) in a mask for the color cyan

i. the even numbered rows of the array are comprised of one or more repetitions of the dot pattern 1010 and

ii. the odd numbered rows of the array are comprised of one or more repetitions of the dot pattern 0001, and

(8) in a mask for the color white

i. the even numbered rows of the array are comprised of one or more repetitions of the dot pattern 1010 and

ii. the odd numbered rows of the array are comprised of one or more repetitions of the dot pattern 0000,

and for each area of the color image

(B) generating a character mask representing the area, and

(C) combining the character mask and the color pattern mask associated with the color of the area so as to replace each colored area with the dot pattern associated with the color of the area.

4,688,032

IMAGE DISPLAY CONTROL APPARATUS

Mitsuo Saito, Yokosuka; Takeshi Aikawa, Kawasaki, and Akio Mori, Tokyo, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Continuation of Ser. No. 508,039, Jun. 27, 1983, abandoned. This application Jun. 24, 1986, Ser. No. 879,539

Claims priority, application Japan, Jun. 28, 1982, 57-111213; Jun. 28, 1982, 57-111226

Int. Cl.[4] G09G *1/16*

U.S. Cl. 340—799 **9 Claims**

1. An image display control apparatus comprising;

a display unit;

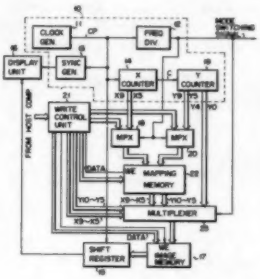
an image memory having a picture element data storing capacity larger than the total number of picture elements on the screen of said display unit;

write control means for writing a plurality of units of data into a plurality of memory locations of said image memory, each unit of data including at least two picture element data;

a mapping memory for storing only address data for specifying the memory locations for the units of data in said image memory in order to correspondingly display the units of data on a plurality of display segments in the screen of said display unit;

first means for reading out the address data from said mapping memory in a display order of said display unit; and

second means for reading out from said image memory the units of data specified by the address data read out by the



first reading means, and for supplying the read-out units of data to said display unit.

4,688,033

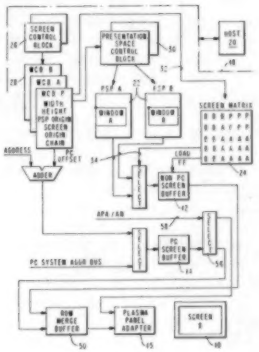
MERGED DATA STORAGE PANEL DISPLAY

Richard P. Carini, Kingston; James A. Donnelly; Joseph J. Ellis, Jr., both of West Hurley, and Thomas P. Lanzoni, Kingston, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 25, 1984, Ser. No. 664,663

Int. Cl.[4] G09G *3/00*

U.S. Cl. 340—800 **9 Claims**



1. A display system for providing image determining data from plural sources to a display device wherein one of the sources provides control codes signifying display screen locations at which data from the other source is to be utilized,

comprising a buffer for receiving and storing data from said one source for a display on the screen of said display device, memory means arranged in operation to store indications of the existence and positions of said control codes in said data corresponding to positions of control codes in said buffer,

and means arranged in operation for receiving and overwriting in said buffer data from the other said source, the writing being under control of said indications in said memory means.

4,688,034
PAGING RECEIVER AND TRANSMITTING DEVICE ADAPTED TO SAID RECEIVER

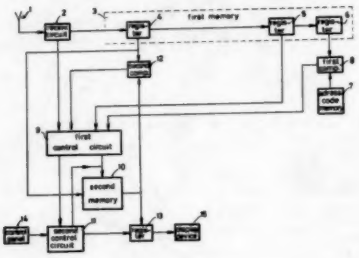
Cornelis C. de Graaf, Emmen, Netherlands, assignor to Ericsson Paging Systems B.V., Emmen, Netherlands

Filed Nov. 27, 1985, Ser. No. 802,687

Claims priority, application Netherlands, Dec. 13, 1984, 8403787

Int. Cl.⁴ H04B *7/00*

U.S. Cl. 340—825.48 **6 Claims**



1. A paging receiver for a paging system of which a transmitter transmits a transmission signal to the receiver, the transmission signal including an address signal portion, a message signal portion and a control signal portion, said receiver comprising:

receiving memory means having a plurality of registers for receiving said signal portions of the transmission signal;

address code memory means for storing at least one address code;

first comparator means for comparing the address signal portion with each address code stored in said address code memory means and supplying a first equality signal in case of equality;

message memory means hvaing two or more locations for storing therein respective message signal portions received with different transmission signals;

first control circuit means which, at the occurrence of the first equality signal, scans locations of said message memory means;

second comparator means for comparing the currently received message signal portion with the message signal portion contained in the contents of the location of said message memory means being currently scanned by said first control circuit means and supplying a second equality signal in case of equality;

second control circuit means for the selection of a location of the second memory for representing the contents of the message signal portion stored in said location on a display connected to said second control circuit means;

whereby, depending on the contents of the control signal portion, said first control circuit means erases said currently scanned location of said message memory means at the occurrence of the second equality signal or may store the currently received message signal portion in a selected location of said message memory means.

4,688,035
END USER DATA STREAM SYNTAX

James P. Gray, Chapel Hill, N.C.; Peter J. Hansen, Ridgefield, Conn.; Michael A. Lerner, Raleigh, and Mark Pozefsky, Chapel Hill, both of N.C., assignors to International Business Machines Corp., Armonk, N.Y.

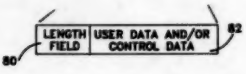
Continuation of Ser. No. 555,723, Nov. 28, 1983, abandoned. This application Jul. 16, 1986, Ser. No. 884,675

Int. Cl.⁴ H04Q *1/00*

U.S. Cl. 340—825.52 **16 Claims**

1. In a computer network having a plurality of nodes with one or more host computers controlling resources associated with a node, an apparatus for generating an improved variable length message for carrying either user data or control information between network addressable units connected to said nodes comprising:

means at each network addressable unit for generating a variable length message including a first field of M data



bytes, and a remainder second field concatenated to the first field, said first field having a data value equal to the summation of the number of bytes in said first and second fields which lies within a range of data for identifying said second field as user data, and having a data value outside of said range for identifying said second field as containing control information.

4,688,036
KEYLESS ENTRY SYSTEM FOR AUTOMOTIVE VEHICLE WITH POWER CONSUMPTION SAVING FEATURE

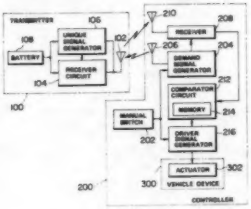
Motoki Hirano, Yokohama; Mikio Takeuchi, and Kinichiro Nakano, both of Zama, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Nov. 28, 1984, Ser. No. 675,649

Claims priority, application Japan, Nov. 29, 1983, 58-224958

Int. Cl.⁴ G08C *19/00*; G06F *7/04*; B62D *45/00*; B60R *25/04*

U.S. Cl. 340—825.69 **31 Claims**



1. A keyless entry system for an automotive vehicle device for actuating the vehicle device to a first active state and a second inactive state, comprising:

an electrical actuator connected to said vehicle device and responsive to a control signal for switching an operating state of said vehicle device between said first and second states;

a manual switch mounted on a vehicle body at a position near said vehicle device to be operated, said manual switch being normally open and being closed when it is manually operated;

a transmitter normally operating in a stand-by state in which it anticipates reception of a demand signal, said transmitter responding to said demand signal by outputting a radio signal indicative of a unique code which identifies said transmitter; and

a controller mounted on the vehicle body and electrically connected to said actuator and said manual switch, incorporating a power supply system which includes said manual switch and is normally inactive so as not to supply electric power to said controller, said power supply system responding to actuation of said manual switch which connects said power supply system to said controller for supplying electric power to said controller for a given period of time, said controller being responsive to the connection of said power supply for broadcasting said

demand signal to said transmitter, for comparing said unique code upon reception from said transmitter to a preset code when said radio signal from said transmitter is received within said given period of time, and for producing said control signal if said unique code matches said preset code, wherein said power supply system is disconnected from said controller after said given period to deactivate said controller.

4,688,037

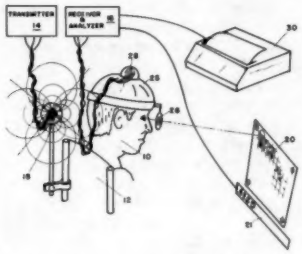
ELECTROMAGNETIC COMMUNICATIONS AND SWITCHING SYSTEM

James C. Krieg, East Peacham, Vt., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Continuation of Ser. No. 179,421, Aug. 18, 1980, abandoned. This application Apr. 19, 1982, Ser. No. 369,815

Int. Cl.[4] G08C *19/00*; G09B *21/00*

U.S. Cl. 340—825.72 **3 Claims**



1. An electromagnetic communications and switching system for use as an invalid communications device comprising:

a plurality of radiating means having independent components defining a reference coordinate frame;

transmitter means for applying to said plurality of radiating means electrical signals which generate a plurality of radio frequency electromagnetic fields, said plurality of electromagnetic fields being distinguishable from one another;

an array of control positions for simulating an alphanumeric keyboard;

a plurality of receiving means, said receiving means having a plurality of independent components for detecting and measuring each of said electromagnetic fields;

means for mounting said receiving means on the head of an operator;

sighting means for defining a line-of-sight for an operator, said sighting means being disposed on said means for mounting in a known relationship with respect to said receiving means, said sighting means thereby being directable by the operator to selectively point to control positions in said array of control positions; and

analyzing means associated with said receiving means for converting the components of said electromagnetic fields received by said receiving means into the position and orientation of said receiving means with respect to said radiating means and thus determining the control positions to which an operator points said sighting means, said analyzing means including means for compiling and displaying a message written by an operator, the operator assembling a message by sequentially pointing said sighting means to control positions on said keyboard.

4,688,038

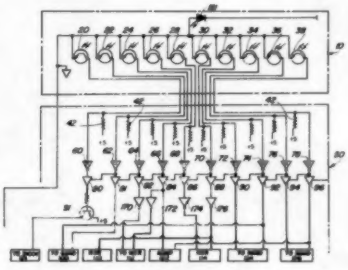
REMOTE METER-READER DEVICE FOR GAS METERS, AND THE LIKE

Victor Giammarese, Chicago, Ill., assignor to Milton S. Gerstein and Marvin Benn, both of Chicago, Ill.

Filed Sep. 30, 1985, Ser. No. 781,670

Int. Cl.[4] G08S *23/00*

U.S. Cl. 340—870.02 **4 Claims**



1. A method of remotely-reading a utility meter having at least one dial having a pointer thereof for indicating the reading of the respective dial, comprising;

retrofitting the dial for remote-reading by placing an array of a plurality of photosensing components in close proximity to the face of the respective dial to be read from a remote site, such that the array of photosensing components senses the position of the pointer at various locations of its angular movement about the dial face;

illuminating the face of the respective dial when it is desired to read the position of the pointer thereof, such that the light from the face of the dial is sent to the array of photosensing components in order for the array of photosensing components to sense the reading of the pointer;

sending a signal in response to said step of illuminating indicative of the reading of the pointer of the respective dial to a digital formation means; and

developing the signal from the array of photosensing components in the digital formation means to produce an output into a remote reading device, whereby the remote reading device may indicate the reading of the respective dial.

4,688,039

HEAT-INSULATED TELEMETRY SYSTEM FOR VACUUM FURNACE

Michael A. Berk, Havertown, Pa., assignor to Abar Ipsen Industries, Feasterville, Pa.

Filed Oct. 17, 1985, Ser. No. 788,238

Int. Cl.[4] G08C *19/12*

U.S. Cl. 340—870.17 **16 Claims**

1. A heat-insulating container for housing a telemetry system for use in a high-vacuum furnace, said container comprising:

a. an outer metal box;

b. an inner box comprising a block of heat-insulating material within said outer box, the length and width of said block corresponding to that of said outer box, the height of said block being less than that of said outer box;

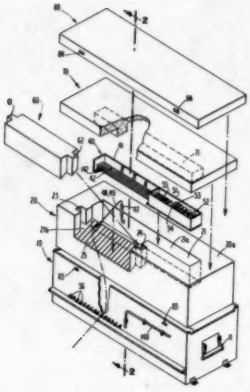
c. a primary cavity in said block;

d. a secondary cavity adjacent said primary cavity, said secondary cavity having a floor which slopes downwardly toward a front wall of said outer box;

e. a telemetry chassis and component parts in said primary cavity, said parts including batteries, transmitters, pressure switches, thermocouple elements including transition tubes, an isothermal double-layer terminal strip having input and output sides, and conductive interconnecting

means, including means connecting said thermocouple elements to said transmitters and means connecting said transmitters to said batteries through said pressure switches;

f. an insert of heat-insulating material slidably and removably fitted into said secondary cavity, said insert having an inclined bottom having a slope corresponding to that of said slope of said floor of said primary cavity;



g. a removable top plate of heat-insulating material having a depending portion removably fitted into an upper portion of said primary cavity; and

h. a metal cover for said container;

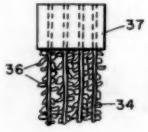
i. said pressure switches being normally open and adapted to close when pressure within said primary cavity falls to a pre-selected sub-atmospheric pressure, thereby to complete the battery connection to a transmitter.

4,688,040

RADAR RETURN SUPPRESSOR

Larry D. Wedertz, Mira Loma; Oakley G. Ross, Paso Robles, and David H. Kristedja, Diamond Bar, all of Calif., assignors to General Dynamics, Pomona Division, Pomona, Calif.

Filed Nov. 28, 1984, Ser. No. 676,035
Int. Cl.[4] H01Q *17/00*
U.S. Cl. 342—3 **5 Claims**



1. A radar return suppressor for targets, comprising:

an elongated pliable support member attachable to the target and components thereof;

radar attenuator means securable to and projecting from said support member for absorbing radar signal energy, said attenuator comprising:

a plurality of closely spaced flexible strands, said flexible strands further comprising flexible vine-like members having intertwined leafed branches securable in and projecting from said support member in spaced apart rows along the length and width of said support member and said vine-like members and leafed branches having radar signal absorbing material dispersed therein; and

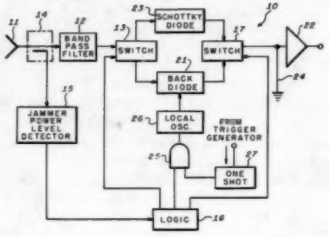
means for attaching said support member to the target.

4,688,041

BASEBAND DETECTOR WITH ANTI-JAM CAPABILITY

Harry M. Cronson, and Gerald F. Ross, both of Lexington, Mass., assignors to Sperry Corporation, New York, N.Y.

Filed Oct. 8, 1981, Ser. No. 336,642
Int. Cl.[4] G01S *7/36*
U.S. Cl. 342—17 **4 Claims**



1. An apparatus for detecting short pulse signals in an interfering signal environment comprising:

signal input means for receiving short pulse and interfering signals;

first means having input means coupled to said signal input means for detecting said short pulse signal and for providing signals representative of said detected short pulse signal at output means thereof;

signal output means coupled to said output means of said first detecting means for providing said signals representative of said detected short pulse signals;

second means having input means coupled to said signal input means for detecting said interfering signal and for providing signals representative of said detected interfering signal at output means thereof;

logic means coupled to said output means of said second detecting means for providing a first signal at first output means of said logic means when said detected interfering signal is above a first predetermined level and a second signal at said first output means of said logic means when said detected interfering signal is below said first predetermined level; and

oscillator means having output means coupled to said first detector means and control input means coupled to said first output means of said logic means for having an oscillating state when said second signal is coupled to said control input means and a non-oscillating state when said first signal is coupled to said control input means, whereby a local oscillator signal is coupled to said detecting means when said second signal is coupled to said control input means and said interfering signal acts as a local oscillator when said first signal is coupled to said control input means.

4,688,042

SHORT PULSE RECEIVER WITH ANTI-JAM CAPABILITY

Harry M. Cronson, Lexington, and Richard M. Mara, Tewksbury, both of Mass., assignors to Sperry Corporation, New York, N.Y.

Filed Oct. 8, 1981, Ser. No. 336,643
Int. Cl.[4] G01S *7/36*
U.S. Cl. 342—19 **10 Claims**

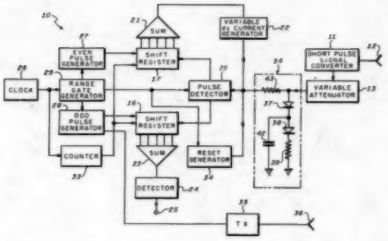
1. A short pulse radar receiver comprising:

means for receiving short pulse radar and interfering signals;

means coupled to said receiving means for generating currents variable within a preselected range of current values

in response to levels of noise and said interfering signals; and

detecting means coupled to said receiving means and to said current generating means for establishing signal thresholds commensurate with said generated current and for providing signals at output means thereof whenever signals coupled from said receiving means exceed said signal thresholds.



4,688,043

HIGH RESOLUTION RADAR SYSTEM

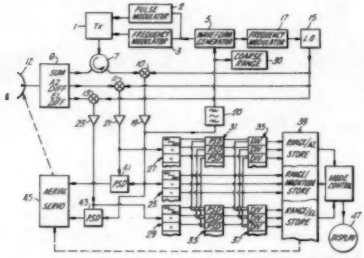
John Welsh, Hertfordshire, England, assignor to Marconi Avionics Limited, England

Filed Apr. 28, 1982, Ser. No. 374,708

Claims priority, application United Kingdom, Apr. 29, 1981, 8113166

Int. Cl.[4] G01S *13/44*

U.S. Cl. 342—149 **7 Claims**



1. A high resolution radar system comprising a radar transmitter adapted to transmit a pulsed microwave signal in which each pulse is frequency-modulated, the system also comprising a radar receiver including a local oscillator, means for modulating the local oscillator frequency at the same linear rate as the transmitted pulse, means for mixing target returns from scatter points on a target with the local oscillator signal so that each scatter point produces a single-frequency (I.F.) signal of frequency unique to the range of the particular scatter point, and means for displaying a collective representation of the various intermediate frequencies whereby to provide target structure information.

4,688,044

MULTIPLE RANGE INTERVAL CLUTTER CANCELLATION CIRCUIT

Edwin L. O'Brien, Fullerton, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jul. 7, 1986, Ser. No. 882,582

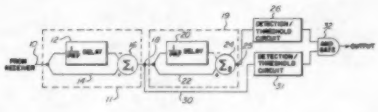
Int. Cl.[4] G01S *13/52*

U.S. Cl. 342—160 **9 Claims**

1. A Moving Target Indicator (MTI) radar processor for processing the radar return signals resulting from n radar pulses transmitted at a constant pulse repetition rate (PRF) to detect moving targets while rejecting clutter in a second range interval; comprising:

a first clutter canceller circuit arranged to process radar return signals received during the n inter-pulse-period (IPP) intervals following the first pulse and to provide a first canceller output signal during the nth such interval;

a second clutter canceller circuit arranged to process radar return signals received during said nth interval and the n−2 immediately preceding intervals and to provide a second canceller output signal during said nth IPP interval;



whereby the first and second canceller circuits provide respective clutter rejection null responses, with the first canceller circuit having increased degrees of freedom for the tailoring of the respective null response in relation to the null response of the second canceller circuit; and

an output processor for processing said first and second canceller circuit output signals and reporting as moving targets only those targets which pass through the clutter rejection nulls of both the first and second canceller circuits, whereby said processor provides the capability of the clutter rejection null response of the first canceller circuit in the first range interval and the capability of the clutter rejection null response of the second canceller circuit in the second range interval.

4,688,045

DIGITAL DELAY GENERATOR FOR SONAR AND RADAR BEAM FORMERS

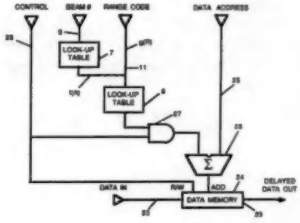
Donald C. Knudsen, P.O. Box 929, Stittsville, Ontario, Canada K0A 3G0

Filed Mar. 17, 1986, Ser. No. 839,929

Claims priority, application Canada, Mar. 21, 1985, 477158

Int. Cl.[4] H01Q *3/00*; G01S *3/80*

U.S. Cl. 342—377 **16 Claims**



1. Beam former control apparatus for multi-transducer array antenna comprising:

a delay circuit for generating a delay or phase shift control signal for each transducer, each delay circuit comprising a first digital apparatus for receiving one or a pair of signals representative of a target direction relative to a predetermined reference point and for providing in response thereto a first signal representing a function of an included angle between lines joining the reference point to the corresponding transducer and the same reference point to the target, and a second digital apparatus in circuit communication with the first digital apparatus for receiving

the first signal and a second signal representative of the range of the target relative to the reference point and for providing in response thereto an output signal corresponding to said control signal.

4,688,046

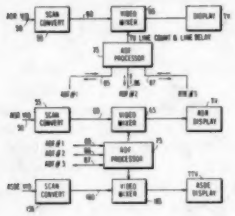
ADF BEARING AND LOCATION FOR USE WITH ASR AND ASDE DISPLAYS

Carl E. Schwab, Huntington Station, N.Y., assignor to ISC Cardion Electronics, Inc., Woodbury, N.Y.

Filed Sep. 13, 1982, Ser. No. 417,251

Int. Cl.[4] G01S *3/02*

U.S. Cl. 342—456 **14 Claims**



1. An aircraft locating system identifying, on a TV format radar display, position of a specific aircraft based on an RF transmission from said aircraft on an RF channel comprising:

at least a pair of receive stations located within several miles of an airport and separated by a base line which is in near proximity to at least one runway at said airport or a theoretical extension thereof,

each said receive station comprising passive receiver means for determining a bearing angle to a source of RF on said RF channel and for generating a signal representative of said bearing angle,

processing means responsive to said signals representative of bearing angle from said receive stations for generating line count and line delay data correlating a position determined by bearing angle signals from at least said pair of receive stations with a frame of reference of said TV display,

video mixer means responsive to a scan converted radar return signal and said line count and line delay data for producting a combined video signal with the ability to highlight a location identified by said line count and line delay data.

4,688,047

METHOD AND APPARATUS FOR SENSING SATELLITE INK DROP CHARGE AND ADJUSTING INK PRESSURE

Hilarion Braun, Xenia; Linda M. Lush, Dayton, and Ralph E. Antolik, III, Huber Heights, all of Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 21, 1986, Ser. No. 899,199

Int. Cl.[4] E01D *18/00*

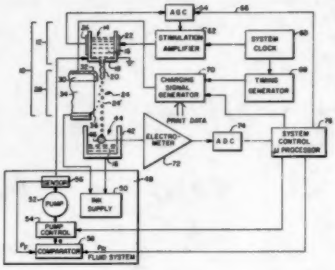
U.S. Cl. 346—1.1 **3 Claims**

1. Apparatus for adjusting ink pressure in a continuous ink jet printer to control ink drop velocity, characterized by:

means for charging the ink jet;

means for stimulating the ink jet to produce infinite satellite drops;

means for detecting the fractional charge imparted to the satellite drops and producing a signal representative of the detected fractional charge; and



means responsive to said signal for adjusting the ink pressure as a function of detected fractional charge.

4,688,048

DROP-ON-DEMAND INK-JET PRINTING APPARATUS

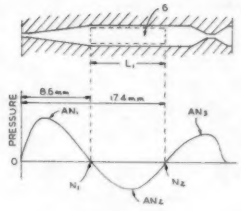
Ryosuke Uematsu; Toyoji Ushioda, and Hiromichi Fukuchi, all of Tokyo, Japan, assignors to Nec Corporation, Japan

Filed Sep. 4, 1986, Ser. No. 903,736

Claims priority, application Japan, Sep. 5, 1985, 60-197027; Sep. 30, 1985, 60-218377

Int. Cl.[4] G01D *15/18*

U.S. Cl. 346—1.1 **15 Claims**



1. A drop-on-demand ink-jet printing apparatus comprising, an ink chamber connected to and filled with an ink supply, said ink chamber including a nozzle for projecting an ink droplet and an elastic surface for deflecting in order to change the volume of said ink chamber, a plurality of pressure vibration modes having a plurality of antinodes when pressure is generated within said ink chamber, and a piezoelectric transducer fixed on said elastic surface at a position corresponding to one of said antinodes of one of said pressure vibration modes, whereby said piezoelectric transducer excites one of said pressure vibration modes in said ink chamber and projects said ink droplet from said nozzle.

4,688,049

CONTINUOUS INK JET PRINTING

James J. Doyle, Cambridge, and Ammar Lecheheb, Newmarket, both of England, assignors to Domino Printing Sciences PLC, Cambridge, England

Filed Jun. 10, 1986, Ser. No. 872,288

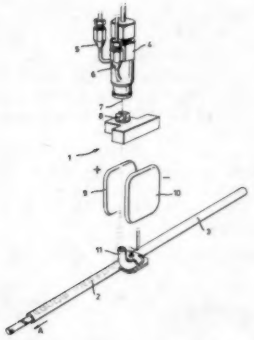
Claims priority, application United Kingdom, Jun. 11, 1985, 8514751

Int. Cl.[4] G01D *15/18*

U.S. Cl. 346—1.1 **6 Claims**

1. A continuous ink jet printing method in which a continuous stream of droplets is produced and a raster comprising a regular number of droplets is used to print each of a plurality

of columns in a matrix to define individual characters, each raster comprising a number of printable drops and a number of non-printable guard drops interspaced between said printable drops, the number of said printable drops which are actually printed being varied appropriately for each column of each of said character, said method being adapted for printing multiple lines of characters, wherein the step of producing each said raster includes the steps of:



increasing the differential charge between drops printed on opposite sides of each interline gap in comparison with that between adjacent drops to be printed within a line; and,

maintaining the number of guard drops at most the same between said printable drops immediately adjacent to each said interline gap;

whereby the distance between printed drops immediately adjacent to each said interline gap is increased without increasing the number of drops in said raster.

4,688,050

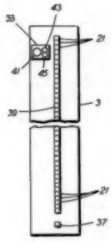
THERMAL TRANSFER PRINTING SYSTEM

Chein-Hwa S. Tsao, San Ramon, Calif., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 663,111, Oct. 22, 1984, abandoned. This application Mar. 10, 1986, Ser. No. 894,431

Int. Cl.[4] G01D *15/10*

U.S. Cl. 346—76 PH **6 Claims**



1. A method of printing which comprises:

(a) providing a record receiving surface;

(b) providing a movable printhead having a set of marking elements greater in number than used for printing a single line, a registration mark forming element and a registration mark detector;

(c) advancing said record receiving surface in line by line increments;

(d) moving said printhead across said record receiving surface, in a direction transverse to said advancing direction, at each line location;

(e) generating printing marks upon said record receiving surface with a subset of said set of marking elements as said printhead is moved in said transverse direction along each printline and generating a registration mark; upon said record receiving surface as said printhead is moved in said transverse direction along each print line, with said registration mark forming element;

(f) detecting said registration mark with said registration mark detector and generating an output signal therefrom;

(g) using said output signal as a measure of the relative location between said printhead location on a given print line and said registration mark location of the preceding print line; and

(h) selecting and activating a subset of said set of marking elements in accordance with said output signal for printing said subsequent given print line.

4,688,051

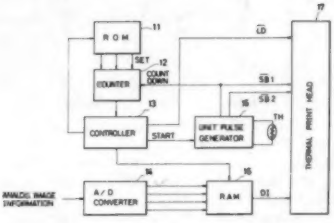
THERMAL PRINT HEAD DRIVING SYSTEM

Toshio Kawakami, Suita; Masaki Mori, Kawasaki, and Chiharu Okada, Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 523,641, Aug. 15, 1983, abandoned. This application May 8, 1985, Ser. No. 732,886

Int. Cl.[4] G01D *15/10*

U.S. Cl. 346—76 PH **17 Claims**



1. A system for driving a thermal print head including a plurality of heat-producing elements which are selectively driven to thermally form an image on a recording medium, comprising:

means for producing driving pulses to be selectively applied to said heat-producing elements;

means for controlling the number of said driving pulses to be applied to each of selected ones of said heat-producing elements in accordance with a tone level signal, said means for controlling including a unit pulse generator for generating unit pulses each having a duty cycle of approximately 50% and a counter which receives a count corresponding to the number of said driving pulses and decrements the count each time said unit pulse generator generates a pulse applied to the selected heat producing elements;

means for detecting the temperature of a predetermined portion of said thermal print head; and

means for adjusting the pulse width of said driving pulses from said means for producing driving pulses in accordance with the temperature detected by said means for detecting.

4,688,052

LIQUID JET RECORDING HEAD HAVING A LAYER OF A RESIN COMPOSITION CURABLE WITH AN ACTIVE ENERGY RAY

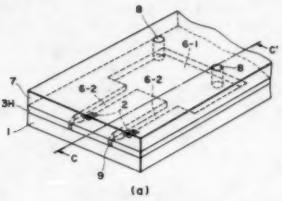
Tadayoshi Inamoto, Machida; Hiromichi Noguchi, and Megumi Munakata, both of Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 8, 1986, Ser. No. 883,349

Claims priority, application Japan, Jul. 13, 1985, 60-153353; Jul. 13, 1985, 60-153355

Int. Cl.[4] G01D *15/18*

U.S. Cl. 346—140 R **11 Claims**



(a)

1. A liquid jet recording head, having a liquid passage communicated to the discharging outlet of the liquid provided on a substrate surface, said passage being formed by subjecting a layer of a resin composition curable with an active energy ray to a predetermined pattern exposure with the use of said active energy ray to thereby form a cured region of said resin composition and removing the uncured region from said layer, said resin composition comprising:

(i) a linear polymer having a glass transition temperature of 50° C. or higher and a weight-average molecular weight of about 3.0×10^4 or more; and

(ii) an epoxy resin comprising at least one compound having two or more epoxy groups in the molecule, the epoxy groups existing in said epoxy resin being partially esterified with an unsaturated carboxylic acid.

4,688,053

LIQUID JET RECORDING HEAD HAVING A LAYER OF A RESIN COMPOSITION CURABLE WITH AN ACTIVE ENERGY RAY

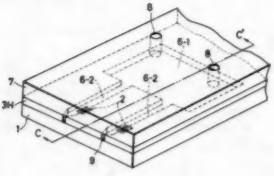
Hiromichi Noguchi, Atsugi; Tadayoshi Inamoto, Machida, and Megumi Munakata, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 8, 1986, Ser. No. 883,155

Claims priority, application Japan, Jul. 13, 1985, 60-153357; Jul. 13, 1985, 60-153361

Int. Cl.[4] G01D *15/18*

U.S. Cl. 346—140 R **7 Claims**



1. A liquid jet recording head having a liquid passage communicated to a liquid discharging outlet provided on a substrate surface, said passage being formed by subjecting a layer of a resin composition curable with an active energy ray to a predetermined pattern exposure with the use of said active energy ray to thereby form a cured region of said resin composition and removing the uncured region from said layer, said resin composition comprising:

(i) a linear polymer having a glass transition temperature of 50° C. or higher and a weight average molecular weight of about 3.0×10^4 or higher;

(ii) a monomer having an ethylenically unsaturated bond;

(iii) an epoxy resin comprising at least one compound having one or more epoxy groups in the molecule; and

(iv) a polymerization initiator capable of generating a Lewis acid by irradiation with an active energy ray.

4,688,054

LIQUID JET RECORDING HEAD

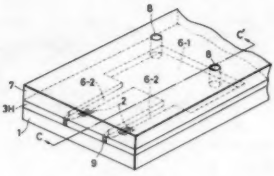
Tadayoshi Inamoto, Machida; Hiromichi Noguchi, and Megumi Munakata, both of Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 30, 1986, Ser. No. 880,210

Claims priority, application Japan, Jul. 9, 1985, 60-149260; Jul. 13, 1985, 60-153352; Jul. 13, 1985, 60-153354

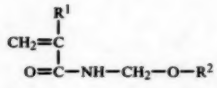
Int. Cl.[4] G01D *15/18*

U.S. Cl. 346—140 R **12 Claims**



1. A liquid jet recording head, having a liquid passage communicated to the discharging outlet of the liquid provided on a substrate surface, said passage being formed by subjecting a layer of a resin composition curable with an active energy ray to a predetermined pattern exposure with the use of said active energy ray to thereby form a cured region of said resin composition and removing the uncured region from said layer, said resin composition comprising the component (i) shown below and at least one of the components (ii) and (iii) shown below:

(i) a graft copolymerized polymer comprising a trunk chain composed mainly of structural units derived from at least one monomer selected from the group consisting of alkyl methacrylates, acrylonitrile and styrene, having graft chains composed mainly of structural units derived from at least one monomer selected from the group consisting of (A) hydroxyl containing acrylic monomers, (B) amino or alkylamino containing acrylic monomers, (C) carboxylic containing acrylic or vinyl monomers, (D) N-vinylpyrrolidone or its derivatives, (E) vinylpyridine or its derivatives and (F) acrylamide derivatives represented by the following general formula I:



(wherein R^1 represents hydrogen or an alkyl or hydroxyalkyl group having 1 to 3 carbon atoms, and R^2 represents hydrogen or an alkyl or acyl group having 1 to 4 carbon atoms which may have one or more hydroxy groups), added to said trunk chain;

(ii) an epoxy resin comprising at least one compound having two or more epoxy groups in the molecule, the epoxy groups existing in said epoxy resin being partially esterified with an unsaturated carboxylic acid; and

(iii) a monomer having an ethylenically unsaturated bond.

4,688,055

LIQUID JET RECORDING HEAD HAVING A LAYER OF A RESIN COMPOSITION CURABLE WITH AN ACTIVE ENERGY RAY

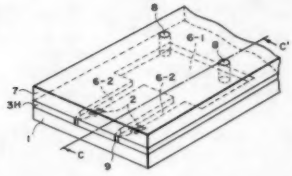
Hiromichi Noguchi, Atsugi; Tadayoshi Inamoto, Machida, and Megumi Munakata, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 3, 1986, Ser. No. 881,620

Claims priority, application Japan, Jul. 13, 1985, 60-153351

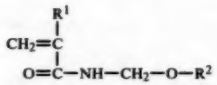
Int. Cl.[4] G01D *15/18*

U.S. Cl. 346—140 R **3 Claims**

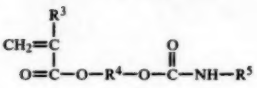


1. A liquid jet recording head, having a liquid passage communicated to the discharging outlet of the liquid provided on a substrate surface, said passage being formed by subjecting a layer of a resin composition curable with an active energy ray to a predetermined pattern exposure with the use of said active energy ray to form a cured region of said resin composition and removing the uncured region from said layer ,

said resin composition comprising (i) a heat-crosslinkable linear copolymer containing 5 to 30 mol % of a monomer represented by the formula I shown below and 5 to 50 mol % of a monomer represented by the formula II shown below, as the copolymer constituents:



(I)



(II)

(wherein R^1 represents hydrogen or alkyl or hydroxyalkyl group having 1 to 3 carbon atoms; R^2 hydrogen or alkyl or acyl group having 1 to 4 carbon atoms which may have a hydroxy group; R^3 hydrogen or alkyl group having 1 to 3 carbon atoms; R^4 divalent hydrocarbon group which may have internally an ether bond and may also be substituted with halogen atoms; and R^5 alkyl having 3 to 12 carbon atoms or phenylalkyl group or phenyl group), and (ii) a monomer having an ethylenically unsaturated bond.

4,688,056

LIQUID JET RECORDING HEAD HAVING A LAYER OF A RESIN COMPOSITION CURABLE WITH AN ACTIVE ENERGY RAY

Hiromichi Noguchi, Atsugi; Tadayoshi Inamoto, Machida, and Megumi Munakata, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 3, 1986, Ser. No. 881,821

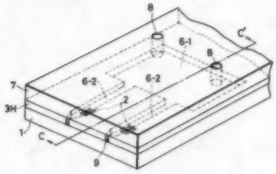
Claims priority, application Japan, Jul. 13, 1985, 60-153356; Jul. 13, 1985, 60-153358

Int. Cl.[4] G01D *15/18*

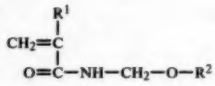
U.S. Cl. 346—140 R **7 Claims**

1. A liquid jet recording head, having a liquid passage communicated to the discharging outlet of the liquid provided on a substrate surface, said passage being formed by subjecting a layer of a resin composition curable with an active energy ray to a predetermined pattern exposure with the use of said active energy ray to thereby form a cured region of said resin composition and removing the uncured region from said layer, said resin composition comprising:

(i) a graft copolymerized polymer comprising a trunk chain composed mainly of structural units derived from at least one monomer selected from the group consisting of alkyl methacrylates, acrylonitrile and styrene, having graft



chains composed mainly of structural units derived from at least one monomer selected from the group consisting of (A) hydroxyl containing acrylic monomers, (B) amino or alkylamino containing acrylic monomers, (C) carboxyl containing acrylic or vinyl monomers, (D) N-vinylpyrrolidone or its derivatives, (E) vinylpyridine or its derivatives and (F) acrylamide derivatives represented by the following formula I:



(I)

(wherein R^1 is hydrogen or an alkyl or hydroxyalkyl group having 1 to 3 carbon atoms, and R^2 is hydrogen or an alkyl or acyl group having 1 to 4 carbon atoms which may have hydroxy group), added to said trunk chain;

(ii) a monomer having an ethylenically unsaturated bond;

(iii) an epoxy resin comprising at least one compound having one or more epoxy groups in the molecule; and

(iv) a polymerization initiator capable of generating a Lewis acid by irradiation of an active energy ray.

4,688,057

HEAT-SENSITIVE TRANSFERRING RECORDING MEDIUM

Seiji Ueyama, Hirakata, Japan, assignor to General Company Limited, Osaka, Japan

Filed Jul. 29, 1985, Ser. No. 759,855

Claims priority, application Japan, Jul. 1, 1985, 60-144204

Int. Cl.[4] B41M *5/18*

U.S. Cl. 503—204 **1 Claim**

1. A heat-sensitive transferring recording medium which comprises a substrate, a heat-sensitive color forming layer on one side of the substrate, and a heat-sensitive transferring ink layer, on the other side of the substrate, consisting essentially of (a) a wax having penetration (JIS K 2235) of not higher than 5 at 25° C. and acid value of 50–70, (b) a wax having penetration (JIS K 2235) of not higher than 5 at 25° C. and saponification value of 70–90 (c) a wax having penetration (JIS K 2235) of 7–20 at 25° C., (d) an extender pigment and (e) a coloring agent, the solid matter of the heat-sensitive transferring ink containing 20–40% by weight of the sum of the components (a) and (b), 20–40% by weight of the component (c) and 20–30% by weight of the component (d).

4,688,058

THERMAL RECORDING MATERIALS

Haruhiko Ikeda, and Shigetoshi Hiraishi, both of Tokyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

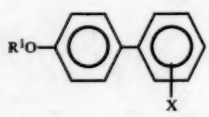
Filed Nov. 19, 1986, Ser. No. 932,346

Claims priority, application Japan, Nov. 20, 1985, 60-262006; Dec. 25, 1985, 60-295861; Dec. 25, 1985, 60-295862; Dec. 25, 1985, 60-295863; Dec. 25, 1985, 60-295864; Dec. 26, 1985, 60-295602; Dec. 28, 1985, 60-297935

Int. Cl.[4] B41M *5/18*

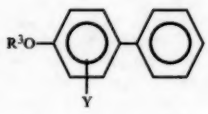
U.S. Cl. 503—209 **26 Claims**

1. A thermal recording material comprising a usually colorless or light-colored dye precursor and a developer which reacts therewith to cause color development thereof on heating, which contains at least one compound selected from the group consisting of Compounds represented by the general formulas (I), (II) and (III):



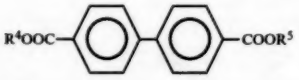
(I)

wherein R^1 is a substituted or unsubstituted alkenyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted cycloalkylcarbonyl group, a substituted or unsubstituted alkynyl group, or a substituted or unsubstituted alkenylcarbonyl group, and X is a hydrogen atom, an alkoxy group, an aralkyloxy group, an aroyloxy group, an alkenyloxy group, or R^2O— in which R^2 is a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted cycloalkylcarbonyl group, a substituted or unsubstituted alkynyl group, or a substituted or unsubstituted alkenylcarbonyl group;



(II)

wherein R^3 is a lower alkyl group, and Y is a halogen atom; and



(III)

wherein each of R^4 and R^5 is a lower alkyl group.

4,688,059

MARKING SYSTEMS

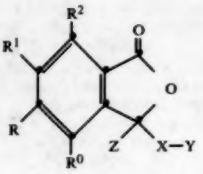
Paul J. Schmidt, Sharonville, and William M. Hung, Cincinnati, both of Ohio, assignors to The Hilton-Davis Chemical Co., Cincinnati, Ohio

Division of Ser. No. 338,008, Jan. 8, 1982, Pat. No. 4,535,172. This application Oct. 20, 1986, Ser. No. 920,829

Int. Cl.[4] B41M *5/16, 5/18, 5/22*

U.S. Cl. 503—220 **5 Claims**

1. A pressure-sensitive carbonless duplicating system or thermal marking system comprising a support sheet coated with a layer containing as a color-forming substance a 3-(X-Y)-3-Z-4-R^0-5-R-6-R^1-7-R^2phthalide according to the formula

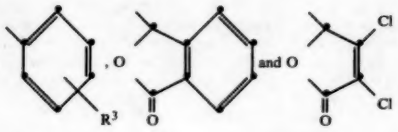


wherein

R^0, R, R^1 and R^2 each represent hydrogen or halo or when R^0, R^2, and one of R and R^1 are each hydrogen, the other of R and R^1 represents dialkylamino, dibenzylamino or N-alkylbenzylamino in which alkyl is non-tertiary C_1 to C_4 alkyl and benzyl is substituted in the benzene ring by one or two of halo or C_1 to C_3 alkyl;

X represents oxygen or sulfur;

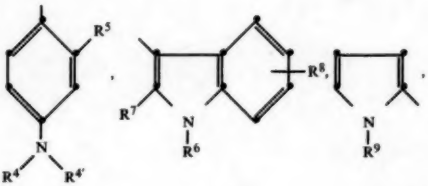
Y represents a non-tertiary C_1 to C_{16} alkyl or is selected from the group consisting of

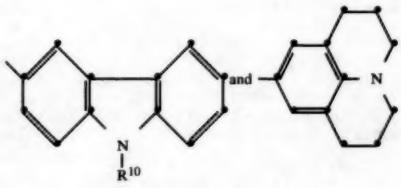


in which

R^3 represents hydrogen, non-tertiary C_1 to C_{18} alkyl, non-tertiary C_1 to C_4 alkyl or halo;

Z is selected from the group consisting of





in which

R^4 and $R^{4'}$ may be identical or different and each represent non-tertiary C_1 to C_4 alkyl, benzyl or benzyl substituted in the benzene ring by one or two of halo or C_1 to C_3 alkyl;

R^5 represents hydrogen, C_1 to C_3 alkyl, non-tertiary C_1 to C_4 alkoxy, halo, dialkylamino, dibenzylamino or N-alkylbenzylamino in which alkyl is non-tertiary C_1 to C_4 alkyl; and benzyl may be substituted in the benzene ring by one or two of halo or C_1 to C_3 alkyl;

R^6 represents hydrogen, non-tertiary C_1 to C_{16} alkyl, benzyl or benzyl substituted in the benzene ring by one or two of halo or C_1 to C_3 alkyl;

R^7, R^9 and R^{10} represent hydrogen, C_1 to C_3 alkyl or phenyl; and

R^8 represents one or two of hydrogen, C_1 to C_3 alkyl, C_1 to C_3 alkoxy, halo or nitro.

4,688,060

PRESSURE SENSITIVE MANIFOLD PAPER

Masato Tanaka, Amagasaki; Shinsuke Irii, Kobe, and Tomoharu Shiozaki, Amagasaki, all of Japan, assignors to Kanzaki Paper Manufacturing Company Limited, Tokyo, Japan

Filed Feb. 4, 1986, Ser. No. 826,016
Claims priority, application Japan, Feb. 14, 1985, 60-29105
Int. Cl.[4] B41M *5/16, 5/22*
U.S. Cl. 503—214 **10 Claims**

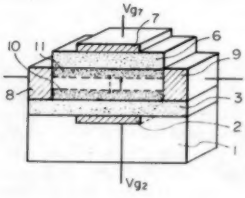
1. A pressure sensitive manifold paper prepared by coating a substrate with a coating composition containing microcapsules of polyurethane resin or polyurea resin wall film and drying the resulting coating, the pressure sensitive manifold paper being characterized in that a latex of copolymer of comonomers comprising about 20% to about 40% by weight of styrene, about 25% to about 45% by weight of butadiene, about 15% to about 30% by weight of methyl methacrylate and about 5% to about 10% by weight of acrylonitrile is incorporated in the coating composition in an amount of about 5% to about 30% by weight (calculated as solids) based on the microcapsules (calculated as solids), wherein said microcapsules enclose chromogenic materials.

4,688,061

MOBILITY-MODULATION FIELD-EFFECT TRANSISTOR

Hiroyuki Sakaki, 174-260, Ohba-cho, Midori-ku, Yokohama-shi, Kanagawa-ken, Japan

Filed Apr. 13, 1983, Ser. No. 484,600
Claims priority, application Japan, Apr. 14, 1982, 57-62175
Int. Cl.[4] H01L *29/80, 29/20, 29/205*
U.S. Cl. 357—22 **5 Claims**



1. A mobility-modulation field-effect transistor comprising:

a plurality of channels having a multilayer structure and being formed from a plurality of semiconductor materials, said plurality of channels having different carrier mobilities and comprising at least first and second channels, said first channel having less impurities than said second channel and accordingly said first channel having a higher carrier mobility than said second channel; and

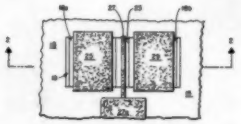
gate electrode means arranged for receiving an applied voltage and for varying relative densities for the carriers within said plurality of channels in accordance with said applied voltage.

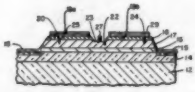
4,688,062

SEMICONDUCTOR STRUCTURE AND METHOD OF MANUFACTURE

Barry J. Liles, Westboro, Mass., assignor to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 626,514, Jun. 29, 1984. This application Feb. 25, 1986, Ser. No. 833,677
Int. Cl.[4] H01L *29/80, 27/02, 29/12, 29/36*
U.S. Cl. 357—22 **5 Claims**





1. A field effect transistor having gate, drain and source electrodes comprising:

a substrate comprising gallium arsenide, said substrate having crystal defects which provide electron and hole traps;

a doped buffer layer disposed over said substrate and comprising a gallium arsenide crystal layer having acceptor energy levels intermediate valence and conduction bands of said crystal layer provided by doping said crystalline layer with chromium to compensate for donor energy levels provided by dopants incorporated into said crystalline layer to provide said layer having a predetermined resistivity characteristic;

a shielding layer disposed over the doped buffer layer comprising a layer of gallium arsenide over said buffer layer having an electron concentration substantially in the range of 10^{14} to 3×10^{15} electrons/cm^3;

an active layer comprising gallium arsenide having a dopant concentration of about 10^{17} electron/cm^3, disposed over said shielding layer;

a gate electrode disposed in Schottky-barrier contact with a portion of said active layer;

a contact layer disposed over portion of said active layer and comprising a highly doped layer of gallium arsenide selected to provide ohmic contact region for drain and source electrodes; and

wherein the electron concentration in the shielding layer provides a small predetermined conduction in said shielding layer to isolate the active layer from a net ionization of said chromium dopant in the buffer layer provided in response to a current flux between drain and source electrodes and from a net ionization of the electron and hole traps provided in said substrate.

4,688,063

DYNAMIC RAM CELL WITH MOS TRENCH CAPACITOR IN CMOS

Nicky C. Lu; Tak H. Ning, both of Yorktown Heights, and Lewis M. Terman, South Salem, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 626,512, Jun. 29, 1984, abandoned. This application Oct. 21, 1986, Ser. No. 920,916
Int. Cl.[4] H01L *29/78*
U.S. Cl. 357—23.6 **46 Claims**

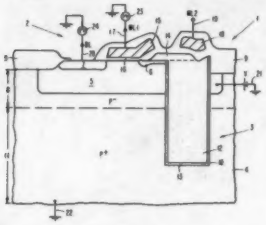
1. A dynamic random access memory cell array comprising:

a substrate of a first conductivity type the upper portion of which is less conductive than its highly conductive lower portion,

a region disposed in said upper portion of said substrate,

having a conductivity type opposite to that of said substrate,

at least one access device disposed in said region, and



at least one storage means extending from the surface of said region through said region and said upper portion into said highly conductive lower portion of said substrate said storage means being electrically isolated from said region and said upper and lower portions.

4,688,064

DYNAMIC MEMORY CELL AND METHOD FOR MANUFACTURING THE SAME

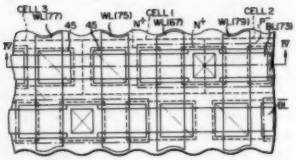
Mitsugi Ogura, and Fujio Masuoka, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 4, 1985, Ser. No. 741,150

Claims priority, application Japan, Jun. 5, 1984, 59-114912; Jun. 5, 1984, 59-114913

Int. Cl.[4] H01L *29/78, 27/02, 29/06, 29/34*

U.S. Cl. 357—23.6 **2 Claims**



1. A dynamic memory device comprising:

a plurality of dynamic memory cells arranged in a matrix of rows and columns; each memory cell having:

a semiconductor substrate of a first conductivity type, a first semiconductor layer of the first conductivity type formed on the semiconductor substrate, at least one hole formed in said semiconductor layer, said semiconductor layer having an impurity concentration higher than that of the semiconductor substrate, a second semiconductor layer of a second conductivity type formed on the inner surface of the hole in the first semiconductor layer, an insulating layer formed on the second semiconductor layer for forming a capacitor and a conductive layer formed on the inner surface of the insulating layer;

a third semiconductor layer of the first conductivity type formed in the surface area of the first semiconductor layer and having an impurity concentration lower than that of the first semiconductor layer;

a MOS (metal oxide semiconductor) transistor formed in the third semiconductor layer; and

means for electrically separating said memory cell from at least one of the adjacent dynamic memory cells in the column direction and adjacent memory cells in the row direction, comprised of an extended area of the first semiconductor layer which extends between the dynamic memory cell and the adjacent dynamic memory cell, and an insulating film which is formed on the extended area of the first semiconductor layer, said insulating film having a thickness equal to, or smaller than, that of the insulating layer used in forming the capacitor.

4,688,065

MOS TYPE SEMICONDUCTOR DEVICE

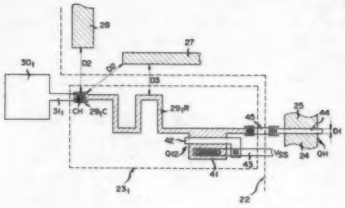
Hiroyuki Kinoshita, Tokyo, and Michihiro Ono, Kawasaki, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Continuation of Ser. No. 550,047, Nov. 9, 1983, abandoned. This application Sep. 4, 1986, Ser. No. 903,844

Claims priority, application Japan, Nov. 11, 1982, 57-198191

Int. Cl.[4] H01L *29/78*

U.S. Cl. 357—23.13 **18 Claims**



1. A MOS type semiconductor device of three semiconductor layer structure comprising:

a first semiconductor layer of a first conductivity type comprising a semiconductor substrate;

a second semiconductor layer of a second conductivity type comprising an impurity diffusion layer of a second conductivity type formed in said first semiconductor layer, said impurity diffusion layer forming an element of a gate-protecting circuit and comprising an input section diffusion layer of said second conductivity type of said gate-protecting circuit, said input section diffusion layer being connected to an external input terminal to which an input voltage is applied; and

a third semiconductor layer of said second conductivity type comprising a plurality of impurity diffusion layers of said second conductivity type formed in said first semiconductor layer, said plural impurity diffusion layers forming elements of a circuit other than said gate-protecting circuit, said plural impurity diffusion layers of said other circuit being separated from each other by at least a first predetermined minimum distance, said plural impurity diffusion layers of said third semiconductor layer being separated from said input section diffusion layer of said second semiconductor layer by a second distance, the second distance being determined to have a value of ten times or more than said first predetermined minimum distance for protecting said gate-protecting circuit from destruction in response to a surge voltage applied to said gate-protecting circuit through said external input terminal.

4,688,066

OPPOSITE DIRECTION MULTIPLE-PHASE CLOCKING IN ADJACENT CCD SHIFT REGISTERS

Hammam Elabd, Mercer County, N.J., assignor to RCA Corporation, Princeton, N.J.

Continuation of Ser. No. 646,103, Aug. 31, 1984, abandoned. This application Dec. 30, 1985, Ser. No. 815,304

Int. Cl.[4] H01L *29/78, 29/04;* **G11C** *19/28*

U.S. Cl. 357—24 **7 Claims**

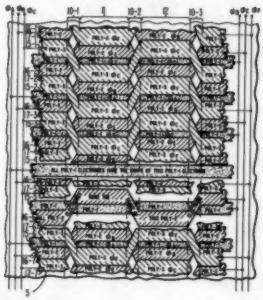
1. In combination:

a clock signal generator for generating plural-phase clock signals;

a semiconductor substrate including a plurality of charge transfer channels formed in a major surface thereof;

a first conductive layer insulated from and overlying said major surface, said first conductive layer having gaps therein for defining a first plurality of gate electrodes in said first conductive layer which cross the length of said charge transfer channels at regularly spaced intervals and are straight across their width so as to be aligned in adjacent ones of said charge transfer channels;

second and third conductive layers insulated from each other and insulated from and successively overlying said first conductive layer, with the first conductive layer



being closest to said major surface of said substrate, including second and third pluralities of gate electrodes, respectively, which meander across corresponding ones of said first plurality of gate electrodes so as to be on opposite sides of said corresponding ones of said first plurality of gate electrodes in adjacent ones of said plurality of charge transfer channels; and

means for applying respective phases of said plural-phase clock signal to said first, second and third pluralities of gate electrodes such that the direction of charge transfer along the length of one charge transfer channel is opposite the direction of charge transfer along the length of a charge transfer channel adjacent said one charge transfer channel.

4,688,067

CARRIER TRANSPORT AND COLLECTION IN FULLY DEPLETED SEMICONDUCTORS BY A COMBINED ACTION OF THE SPACE CHARGE FIELD AND THE FIELD DUE TO ELECTRODE VOLTAGES

Pavel Rehak, Patchogue, N.Y., and Emilio Gatti, Lesmo, Italy, assignors to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Feb. 24, 1984, Ser. No. 583,553

Int. Cl.[4] H01L *27/14, 29/80, 29/78, 31/00*

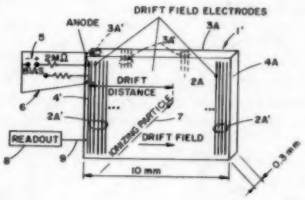
U.S. Cl. 357—29 **2 Claims**

1. A charge transport device adapted for use as a drift chamber comprising:

a wafer of semiconductor material having first and second major surfaces and a thinner edge surface, each of said major surfaces being less than 15×15 centimeters square and more than 0.3×0.3 centimeters square, and the width of said edge surface, measured between the major surfaces, being in the range of 0.1 to 1.0 millimeters.

a first rectifying electrode formed on or affixed to said first major surface, a second rectifying electrode formed on or affixed to said second major surface, said first and second rectifying electrodes each being formed of a plurality of strip electrodes that are distributed, respectively, in arrays over major portions of said first and second major surfaces, and a small capacitance ohmic contact comprising several articulated contact strips which in combined length are substantially equal in length to one of the strip electrodes in one of said arrays, said ohmic contact being formed on or affixed to said wafer adjacent to or on said edge surface, whereby the ohmic contact is positioned closer to the edge surface of the wafer than is the rectifying strip electrode that is closest to the ohmic contact,

a voltage source and circuit means connected to apply predetermined bias voltages across portions of the wafer between said contact and the respective electrodes, thereby to reverse bias the rectifying junction at each of said electrodes to form a charge transport potential for continuously moving charged particles or charge carriers



away from said electrodes and toward the ohmic contact, said predetermined bias voltages being further and independently effective to form fully depleted regions in said portions of the wafer between the ohmic contact and the rectifying electrodes,

said device being operable to receive ionizing particles or radiation into said fully depleted regions, for detecting a charge released in said regions, and for measuring the position or energy of said detected charge, and

output means operatively coupled to said ohmic contact to read out changes in current induced at the contact due to the transport of a charge in the depleted regions of the device to said contact, thereby to provide a measure of the position and energy of a detected particle.

4,688,068

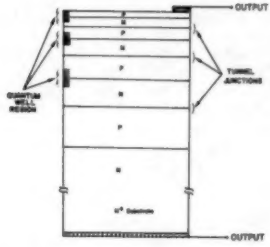
QUANTUM WELL MULTIJUNCTION PHOTOVOLTAIC CELL

Roger J. Chaffin, and Gordon C. Osbourn, both of Albuquerque, N. Mex., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.

Continuation of Ser. No. 512,059, Jul. 8, 1983, abandoned. This application Feb. 28, 1986, Ser. No. 834,670

Int. Cl.[4] H01L *27/14, 31/00*

U.S. Cl. 357—30 **17 Claims**



1. A monolithic, quantum well, multilayer, multijunction photovoltaic cell comprising:

at least two p-n junctions electrically connected to each other;

each p-n junction comprising a p-region on one side and an

n-region on the other side, each of which regions comprises a series of at least three semiconductor layers, all p-type in the p-region and all n-type in the n-region, said layers forming a strained layer superlattice;

each of said series of layers in each p-n junction comprising alternating barrier and quantum well layers, each barrier layer comprising a semiconductor material having a first bandgap when the semiconductor material is in bulk thickness, and each quantum well layer comprising a semiconductor material that has a second bandgap when the semiconductor material is in bulk thickness, the bandgap being narrower than said first bandgap,

the barrier layers sandwiching each quantum well layer and each quantum well layer being present in less than bulk thickness and being sufficiently thin that the width of its operational bandgap in each p-n junction is between said first and second bandgaps, said operational bandgap being the effective bandgap of the p-n junction;

the operational bandgap of at least one of said p-n junctions being different from that of at least one other p-n junction;

whereby radiation incident on said cell and above an energy determined by the operational bandgap of at least one of said p-n junctions will be absorbed and will produce an electrical potential across said junction.

4,688,069

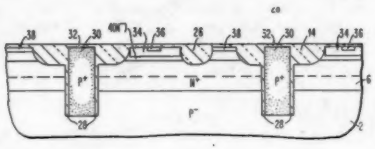
ISOLATION FOR HIGH DENSITY INTEGRATED CIRCUITS

Richard C. Joy, Beacon; Bernard M. Kemlage, Kingston, both of N.Y., and John L. Mauer, IV, South Kent, Conn., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 592,060, Mar. 22, 1984. This application Dec. 6, 1985, Ser. No. 806,060

Int. Cl.[4] H01L *29/72*

U.S. Cl. 357—34 **7 Claims**



1. An integrated circuit structure having a semiconductor material body, an integral isolation and substrate contact structure for isolating semiconductor devices from one another, and for providing a conducting path to a substrate common to said semiconductor devices, comprising;

a pattern of embedded isolation structures surrounding said semiconductor devices;

at least one of said embedded isolation structures comprising a combination having a first portion and a second portion,

said first portion comprising a shallow recessed oxide portion extending approximately from the surface of said semiconductor material body downward into said semiconductor material body;

said recessed oxide portion having substantially vertical edges, said edges abutting an adjacent one of said semiconductor devices,

said second portion comprising a deep portion extending through said recessed oxide portion and extending further into the semiconductor material body to the common substrate of said integrated circuit devices;

said recessed oxide portion being substantially shallower than said deep portion and also substantially surrounding those portions of said deep portion extending through said recessed oxide portion so that a collar of recessed oxide isolation is formed around said deep portion;

an opening through said first and second portions from the surface of said semiconductor material body to said substrate, and

a conducting material filling said opening to provide a conducting path to said substrate.

4,688,070

SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE

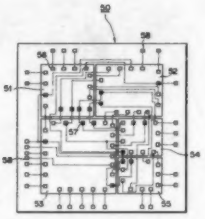
Yoshihisa Shiotari, Yokohama, and Kenichi Nagao, Ayase, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 23, 1984, Ser. No. 613,302

Claims priority, application Japan, May 24, 1983, 58-91002; May 24, 1983, 58-91003

Int. Cl.[4] H01L *27/02*

U.S. Cl. 357—40 **27 Claims**



6. A semiconductor integrated circuit device for providing the functions of two or more discrete integrated circuit chips, each of which have original bonding pads, comprising:

a single semiconductor substrate;

a first integrated circuit region formed on said single semiconductor substrate, having substantially the same pattern and function as said first integrated circuit chip, and having external terminals corresponding to said original bonding pads of said first integrated circuit chip;

a second integrated circuit region formed on said single semiconductor substrate, having substantially the same pattern and function as said second integrated circuit chip, and having external terminals corresponding to said original bonding pads of said second integrated circuit chip, the function of said second integrated circuit region being different from that of said first integrated circuit region; and

a plurality of outer bonding pads formed on a region of said semiconductor substrate which is located outside said integrated circuit regions, said plurality of outer bonding pads being used as bonding pads of a said semiconductor integrated circuit device.

4,688,071

CIRCUIT ARRANGEMENT COMPRISING A PHOTOTRANSISTOR

Jenoe Tihanyi; Christine Fellinger, and Ludwig Leipold, all of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Oct. 22, 1984, Ser. No. 663,363

Claims priority, application Fed. Rep. of Germany, Dec. 8, 1983, 3344428

Int. Cl.[4] H01L *27/02*

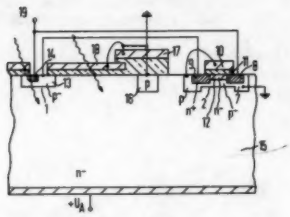
U.S. Cl. 357—41 **9 Claims**

1. A circuit arrangement, comprising:

a phototransistor having a base, a collector, and an emitter, the collector connecting to a first potential, the emitter connecting to a second potential through means for providing a voltage drop, and a source-drain path of an IGFET of depletion type connected across the base and emitter of the phototransistor; and

a gate terminal of said IGFET being connected to a potential

having a value such that when the phototransistor is not illuminated, the IGFET is conducting, and as the photo-



transistor becomes illuminated, the voltage dropping means causing the IGFET to become non-conducting.

4,688,072

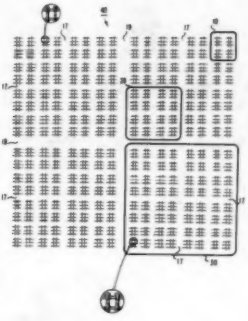
HIERARCHICAL CONFIGURABLE GATE ARRAY

Herbert E. Heath, Los Angeles, and Jay M. Block, Thousand Oaks, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Continuation of Ser. No. 626,086, Jun. 6, 1984. This application Jul. 7, 1986, Ser. No. 882,446

Int. Cl.⁴ H01L *27/10, 27/02, 23/48, 29/52*

U.S. Cl. 357—45 **10 Claims**



1. An hierarchical gate array comprising:

at least three clusters of increasing level and size, each cluster having logic gates grouped in a plurality of cluster elements where the number of gates in a cluster increases with cluster level;

respective interconnect regions within each cluster for accommodating selected interconnections between cluster elements, said selected interconnections defining respective cluster functions for each said cluster and said interconnect regions having respective areas related to the respective number of gates in respective clusters;

respective input/output means located about the periphery of each cluster for providing access to the cluster functions of respective cluster regions; and

wherein each higher level cluster above the first level cluster includes as its cluster elements a plurality of lower level clusters separated by a respective interconnect region which accommodates interconnections between the respective input/output means of said lower level clusters.

4,688,073

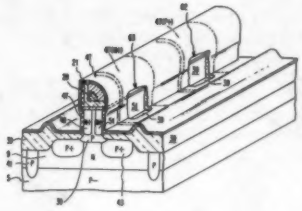
LATERAL DEVICE STRUCTURES USING SELF-ALIGNED FABRICATION TECHNIQUES

George R. Goth, 68 Todd Hill Rd., Poughkeepsie, N.Y. 12603, and Shashi D. Malaviya, 1 Trenton Rd., Fishkill, N.Y. 12524

Continuation of Ser. No. 674,439, Nov. 23, 1984, abandoned, which is a division of Ser. No. 248,918, Mar. 30, 1981, Pat. No. 4,508,579. This application Mar. 19, 1986, Ser. No. 841,143

Int. Cl.⁴ H01L *29/08, 29/72, 29/91, 27/04*

U.S. Cl. 357—56 **20 Claims**



1. An integrated semiconductor body including semiconductor device structures comprising a narrow submicron-wide protrusion of semiconductor material integral with and extending outward from a semiconductor pedestal therefor with said narrow protrusion having opposing planar vertical surfaces and a top horizontal surface, said vertical surfaces being fully covered with an insulative material except for selected localized regions thereof, said localized regions having a surface area substantially smaller than that of said vertical surfaces, said horizontal surface being covered by an insulator stud of substantially the same width as that of said protrusion and said protrusion having electrical contacts made to said selected localized regions.

4,688,074

CONNECTING STRUCTURE FOR A DISPLAY DEVICE

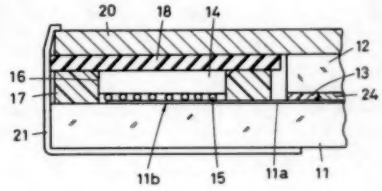
Yoshio Iinuma, Tokorozawa, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 481,253, Apr. 1, 1983, abandoned. This application Dec. 13, 1985, Ser. No. 808,370

Claims priority, application Japan, Apr. 6, 1982, 57-057129

Int. Cl.⁴ H01L *23/12, 23/32, 27/20, 21/603*

U.S. Cl. 357—79 **6 Claims**



1. A connecting assembly comprising:

a liquid crystal display device having a first front glass substrate, a second back glass substrate overlying said first front glass substrate, a liquid crystal material provided between said first and second glass substrates, said first front glass substrate having a peripheral portion which extends on three sides thereof beyond a periphery of said second back glass substrate;

a plurality of terminals provided on an upper surface of said first glass substrate on said peripheral portion of said substrate which extends beyond the periphery of said

second glass substrate in a matrix arrangement at a pitch between 300 and 500 μm;

a plurality of leads provided on said upper surface of said first front glass substrate, electrically connecting said liquid crystal display device with said terminals;

a holding member secured on said peripheral portion of said first glass substrate surrounding said terminals;

a LSI semiconductor having a plurality of terminals superimposed over and corresponding to said plurality of terminals on said upper surface of said first glass substrate, said LSI semiconductor held by said holding member;

an elastic plate mounted on said LSI semiconductor and corresponding holding member having an upper surface substantially flush with an upper surface of said second glass substrate;

a back plate mounted on the respective upper surfaces of said elastic plate and said second glass substrate; and

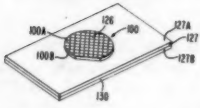
a detachable clamping means for pressing said back plate respectively against said elastic plate and second glass substrate whereby said terminals of said LSI semiconductor are pressed against said corresponding terminals of said liquid crystal display device on said upper surface of said first glass substrate.

4,688,075

INTEGRATED CIRCUIT HAVING A PRE-ATTACHED CONDUCTIVE MOUNTING MEDIA AND METHOD OF MAKING THE SAME

William S. Phy, Los Altos Hills, Calif., assignor to Fairchild Semiconductor Corporation, Cupertino, Calif.

Filed Jul. 22, 1983, Ser. No. 516,019
Int. Cl.⁴ H01L *39/02*
U.S. Cl. 357—80 **19 Claims**



1. A semiconductor body comprising:

an integrated circuit obtained from a semiconductor wafer, wherein a major surface of said integrated circuit consists of a portion of a major surface of said wafer; and

an electrically conductive mounting medium attached to the major surface of said integrated circuit, said conductive mounting medium being obtained from an electrically conductive tape attached to the major surface of said wafer.

5. A method of attaching a conductive mounting media to an integrated circuit, comprising the steps of:

(a) providing a semiconductor wafer including a plurality of integrated circuits therein, said wafer having a pair of opposing major surfaces, one of the surfaces including a plurality of electrical contacts for each of the integrated circuits;

(b) attaching the other of the major surfaces of the wafer to a first major surface of a preformed electrically conductive tape; and

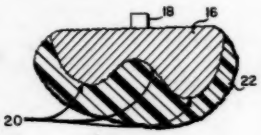
(c) separating individual ones of the integrated circuits wherein each of said individual ones includes conductive mounting media attached thereto with said media comprising a portion of the electrically conductive tape.

4,688,076

NOISE REDUCING HEAT SINK FOR SEMICONDUCTOR LASER DIODES

Jacques R. Chamuel, Framingham, Mass., assignor to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.

Continuation of Ser. No. 487,603, Apr. 22, 1983, abandoned.
This application Apr. 1, 1986, Ser. No. 847,125
Int. Cl.⁴ H01L *23/36, 23/40*
U.S. Cl. 357—81 **33 Claims**



1. A nose reducing heat sink for an electrically activated element of a type which produces stress waves upon electrical activation of said element comprising:

a heat conductive material having a first surface and a mounting location on said first surface for mounting said electrically activated element to said heat conductive material;

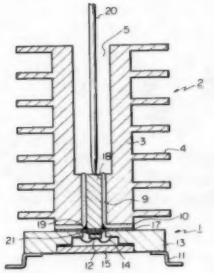
said heat conductive material having other surfaces in addition to said first surface, and wherein all said other surfaces have means for irregularly diverting said stress waves produced by said electrical element and means for scattering said stress waves incident thereon, thereby avoiding focussed reflection of said stress waves at said mounting location on said first surface.

4,688,077

SEMICONDUCTOR DEVICE HAVING RADIATOR

Tetsushi Wakabayashi, Yokohama; Masahiro Sugimoto, Yokosuka, and Kiyoshi Muratake, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 479,435, Mar. 28, 1983, abandoned.
This application Jan. 28, 1986, Ser. No. 822,964
Claims priority, application Japan, Mar. 29, 1982, 57-50733
Int. Cl.⁴ H01L *23/02*
U.S. Cl. 357—81 **12 Claims**



1. A semiconductor device including a semiconductor chip for mounting on a base plate, comprising:

a semiconductor package, for housing the semiconductor chip, having a width and having first and second main surfaces on opposite sides of the package from each other, the first main surface having a plurality of lead terminals extending a predetermined distance from the semiconductor package in the direction of said width and being in confronting relationship with the base plate, and the second main surface facing away from the base plate; and

a radiator having a pillar and a plurality of disc-shaped fins extending from said pillar, a bottom end of said pillar being bonded to the second main surface of said semiconductor package, a top end of said pillar having a first hole for insertion of a handling instrument for transportation of said semiconductor package, said first hole extending into said pillar along a longitudinal direction of said pillar and opening away from the semiconductor package and the base plate, the radius of each disk-shaped fin being larger than half the width of said package and smaller than half the width of said semiconductor package plus the predetermined distance.

4,688,078

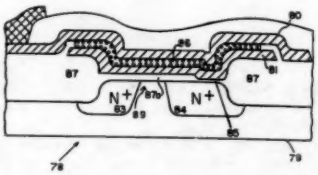
PARTIALLY RELAXABLE COMPOSITE DIELECTRIC STRUCTURE

Ning Hseih, 1573 Larkin Ave., San Jose, Calif. 95129

Continuation of Ser. No. 430,203, Sep. 20, 1982, abandoned. This application Dec. 11, 1985, Ser. No. 808,330

Int. Cl.[4] H01L *29/78*

U.S. Cl. 357—23.5 **16 Claims**



1. A Programmable Read Only Memor device comprising:

a semiconductor substrate;

a source formed within said semiconductor substrate;

a drain formed within said semiconductor substrate;

a channel region formed within said semiconductor substrate between said source and said drain;

a gate dielectric formed on said channel region;

a floating gate located above said channel region and spaced apart from said channel region by said gate dielectric;

a control gate lcoated above said floating gate and separated therefrom; and

a partially relaxable dielectric formed between said control gate and said floating gate for capacitively coupling said floating gate and said control gate, said partially relaxable dielectric comprising a first portion comprising a silicon-rich dielectric located adjacent said control gate, a second portion comprising a silicon-rich dielectric located adjacent said floating gate, and a third portion comprising a dielectric located between said first and second portions, said first and second portions being formed to have conductivities such that application of an electric field having a magnitude greater than a predetermined value between said control gate and said floating gate causes said first and second portions of said partially relaxable dielectric to behave electrically as parts of said control gate and said floating gate, respectively, such that said capacitive coupling between said control gate and said floating gate increases whenever said electric field between said control gate and said floating gate exceeds said predetermined value such that said partially relaxable dielectric serves as a dielectric equivalent to said third portion, said gate oxide and said partially relaxable dielectric having capacitances such that voltages applied across said drain and said control gate divide between said partially relaxable dielectric and said gate oxide in a ratio causing electron tunnelling between said drain and said floating gate while preventing electron tunnelling between said control gate and said floating gate.

4,688,079

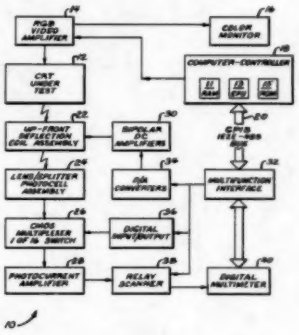
COLOR CRT PURITY MEASUREMENT

James R. Fendley, Arlington Heights, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Filed Aug. 5, 1986, Ser. No. 893,420

Int. Cl.[4] H04N *17/04*

U.S. Cl. 358—10 **15 Claims**



8. Apparatus for measuring color purity errors in a shadow-mask type color CRT having a faceplate with a plurality of phosphor dot trios arranged in a periodic array thereon and upon which is incident a plurality of electron beams corresponding to the three primary colors of red, green and blue, said apparatus comprising:

electron beam deflection means positioned in front of the CRT's faceplate for changing the location of incidence of the electron beams upon the faceplate;

movable optical detector means positioned in front of the CRT's faceplate for detecting each of the three primary colors on a portion of the CRT's faceplate upon which the electron beams are incident;

drive means coupled to said electron beam deflection means for supplying signals to energize said electron beam deflection means for changing the location of incidence of the electron beams on the CRT's faceplate; and

controller means coupled to said electron beam deflection means and to said optical detector means for displacing said electron beams with respect to each of their respective phosphor dots in a given phosphor dot trio and responsive to changes in light intensity emitted by the phosphor dots as detected by said optical detector means for measuring the color purity of each of the primary colors in the CRT.

4,688,080

MULTI-STANDARD ADAPTIVE CHROMINANCE SEPARATOR

Steven D. Wagner, San Jose, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Sep. 27, 1985, Ser. No. 781,843

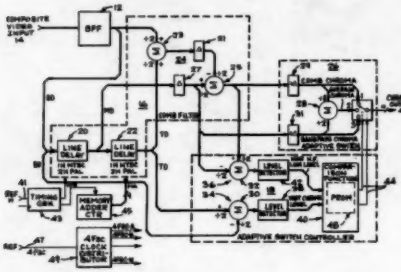
Int. Cl.[4] H04N *9/78*

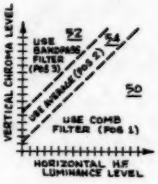
U.S. Cl. 358—31 **27 Claims**

1. A circuit for separating chrominance and luminance signals via an adaptive selection of a bandpass filter and a comb filter, comprising:

means for detecting a preselected chrominance and luminance level relationship, and

means for adaptively switching to at least one of the filters in response to the detection by the detecting means of said





preselected chrominance and luminance level relationship.

4,688,081

APPARATUS FOR CORRECTING TIME BASE ERROR OF VIDEO SIGNAL

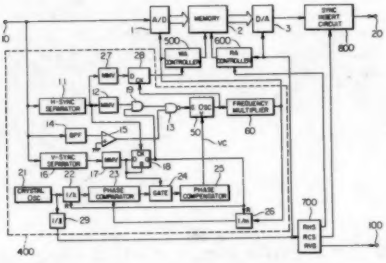
Takashi Furuhata, and Hitoaki Owashi, both of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 22, 1986, Ser. No. 821,444

Claims priority, application Japan, Jan. 25, 1985, 60-10866; Jan. 25, 1985, 60-10869

Int. Cl.[4] H04N *9/89*

U.S. Cl. 358—19 **39 Claims**



1. A time base correcting apparatus of a video signal having a memory into which or from which a writing or a readout can be sequentially performed, in which a time base of the video signal is corrected by sampling the video signal in the direction of the time base and sequentially writing into said memory and also sequentially reading the video signal written, said time base correcting apparatus comprising:

means for separating a burst signal multiplexed to said video signal;

oscillating means which starts oscillating by receiving said burst signal separated and continues the oscillation for the period when said separated burst signal does not exist;

reference signal generating means for generating a read clock for said memory;

phase comparing means for generating a phase difference signal by phase comparing a signal based on an output of said oscillating means and a signal based on an output of said reference signal generating means;

means for controlling an oscillating frequency of said oscillating means in a negative feedback manner using said phase difference signal for a vertical blanking period of said video signal; and

means for generating a write clock for said memory from the output of said oscillating means.

4,688,082

MULTI-SYSTEM TELEVISION RECEIVER

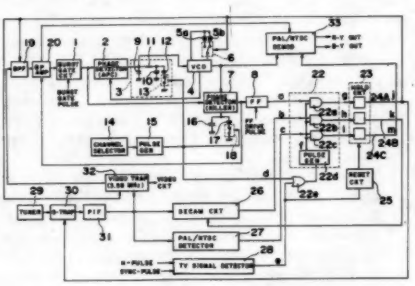
Tomio Kato, Utsunomiya, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed May 16, 1985, Ser. No. 735,048

Claims priority, application Japan, May 23, 1984, 59-75991[U]; May 30, 1984, 59-81275[U]; Nov. 13, 1984, 59-171993[U]

Int. Cl.[4] H04N *5/46*

U.S. Cl. 358—21 R **5 Claims**



1. A multi-system television receiver capable of receiving television signals of the PAL system, SECAM system and NTSC system, comprising:

an APC loop including a voltage controlled oscillator and vibrating elements selectively coupled to said oscillator for producing an oscillation signal at different frequencies;

a phase detector for detecting a phase difference between a burst signal of the received television signal and said oscillation signal from said oscillator and outputting a signal corresponding thereto;

a flip-flop which is controlled by said signal produced from said phase detector;

a killer circuit for generating a color killer signal for the SECAM system in response to a received television signal of the PAL or NTSC system; and

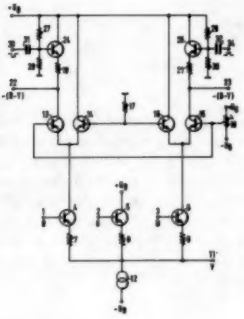
a switching circuit controlled by said flip-flop and said killer circuit for selecting one vibrating element for effecting the oscillation of said voltage controlled oscillator at a required frequency.

4,688,083

CIRCUIT ARRANGEMENT FOR MATRIXING THREE CHROMA SIGNALS TO OBTAIN COLOR DIFFERENCE AND A LUMINANCE SIGNAL

Heinz Hess, Weiterstadt, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jun. 18, 1986, Ser. No. 875,610
Claims priority, application Fed. Rep. of Germany, Jun. 27, 1985, 3522986
Int. Cl.[4] H04N 9/67
U.S. Cl. 358—30 4 Claims



1. Circuit for matrixing three chroma signals (R, G, B) to obtain color difference signals (R-Y) and (B-Y) and a luminance signal (Y), said circuit having

three transistor stages (4, 5, 6), each transistor stage having a chroma signal applied to a control electrode of the respective stage;

a matrixing resistor (7, 8, 9) connected to one of the main current electrodes of each transistor stage, and further connected, in common, to a common terminal, said common terminal being connected to a constant current source, whereby the luminance signal (Y) is available at said common terminal (11) and the current difference signals are available at the other main current electrodes of the transistor stages associated with that color which is to form the color difference signal,

and comprising, in accordance with the invention,

two further transistor stages, each including two further transistors (13, 14; 15, 16) having their emitters connected together, said connected emitters being connected to and controlled by the respective other main current electrodes of the first transistor stages (4, 6);

and a circuit arrangement to provide for amplitude control of the color difference signals comprising

means (17) for connecting a first transistor (14, 16) of each of said two further transistors to a source of reference voltage,

means for connecting a second transistor (13, 15) of each of said two further transistors to a source (U_G, 18) of controllable voltage;

means for connecting one (14, 16) of the further transistors of said two further transistor stages to a source of supply voltage (U_B); and

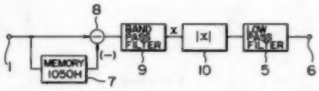
means (22, 19, 24, 33; 23, 21, 25, 34; U_B) for deriving said color difference signals (R-Y; B-Y) from the other (13, 15) of the further transistors of said two further transistor stages.

4,688,084

MOVEMENT DETECTION CIRCUIT FOR TELEVISION SIGNALS

Masahiko Achiha, Iruma, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 2, 1986, Ser. No. 881,401
Claims priority, application Japan, Jul. 12, 1985, 60-152206
Int. Cl.[4] H04N 9/78
U.S. Cl. 358—36 5 Claims



1. A movement detection circuit for extracting movement information of an object included in a composite color television signal in which a chrominance signal modulated with a subcarrier frequency is superimposed on a luminance signal, said circuit comprising:

a first filter for detecting temporal variations in said composite color television signal;

a second filter for extracting a signal having the subcarrier frequency as its center frequency out of an output signal of said first filter;

a converter having a non-linear characteristic for converting an output of said second filter into a coefficient representing the movement information; and

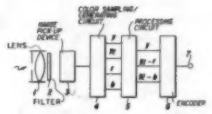
a low-pass filter for passing a low frequency component of an output of said converter.

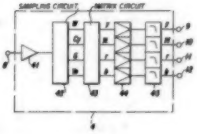
4,688,085

ENHANCED SENSITIVITY COLOR VIDEO CAMERA WITH REDUCED RED COMPONENT IN SECOND LUMINANCE SIGNAL

Takuya Imaide, Yokohama, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 16, 1985, Ser. No. 755,684
Claims priority, application Japan, Aug. 13, 1984, 59-167875
Int. Cl.[4] H04N 9/07, 9/67, 5/30
U.S. Cl. 358—44 22 Claims





1. A color video camera, comprising:

means for picking up an image to provide an image signal, to which a color filter having a plurality of separate color filter elements is attached,

means, connected to said picking up means, for generating a first luminance signal, a second luminance signal and color channel signals from said image signal, said generating means including a matrix circuit for producing said first luminance signal, said second luminance signal and said color channel signals from said image signal, said matrix

circuit using first matrix coefficients for producing the portion of said second luminance signal related to a red component and second matrix coefficients for producing the portion of said second luminance signal related to another color component, said first matrix coefficients being less than said second matrix coefficients to reduce the red component of said second luminance signal,

means, connected to said generating means, for processing said second luminance signal and said color channel signals to provide color difference signals, and

means, connected to said processing means, for producing a color video signal in accordance with said first luminance signal and said color difference signals.

4,688,086

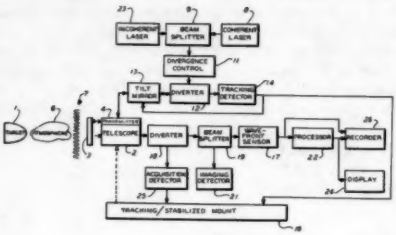
METHOD OF IMAGING A TARGET ILLUMINATED THROUGH AN OPTICALLY DISTORTING REGION

Richard A. Hutchin, Marlboro, Mass., assignor to Itek Corporation, Lexington, Mass.

Filed Jun. 18, 1985, Ser. No. 721,681

Int. Cl.[4] H04N 7/18

U.S. Cl. 358—95 **12 Claims**



1. Method of imaging a target by directing electromagnetic radiation at said target through an optically distorting region bending said radiation therethrough comprising the steps of:

a. illuminating said target by projecting narrow band coherent electromagnetic radiation through said region at said target;

b. recording a first set of data indicative of the complex amplitude of said radiation scattered by said target back through said region as a result of step a, said first set of data containing information indicative of the nature of said target and said turbulent region;

c. illuminating said target with broadband incoherent electromagnetic radiation;

d. recording a second set of data indicative of the complex amplitude of said radiation scattered as a result of step c, said second set of data indicative of the nature of said region;

e. combining said first and second sets of data for producing a third set of data devoid of data indicative of the nature of said region; and

f. Fourier-transforming said third set of data to reconstruct the image of said target.

4,688,087

LIGHT PROJECTOR HAVING A CONTROLLABLE INTENSITY OF ILLUMINATION

Felix Ams, Kämpfelbach; Ulrich Bolg, Sulzfeld, and Helmut Wurster, Oberderdingen, all of Fed. Rep. of Germany, assignors to Richard Wolf GmbH, Fed. Rep. of Germany

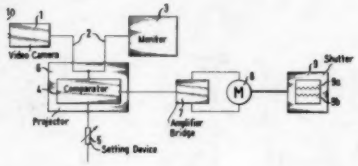
Filed Feb. 14, 1986, Ser. No. 829,615

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1985, 3509825

Int. Cl.[4] H04N 7/18

U.S. Cl. 358—100 **6 Claims**

1. A light projector assembly comprising a system for adjusting the intensity of the illumination of a cavity to be examined by means of video camera, said assembly including a light projector having a beam path, a shutter with a shutter aperture being arranged in the light path and having two blades, which are movable towards each other to overlap for a closing action and in the opposite direction for an opening action, the shutter aperture being determined by the area of at least one gap between the mutually opposed blade edges, a video camera for creating a video signal in response to an image being illuminated in said cavity, a monitor screen for receiving the video signal and displaying the image recorded by the video camera, a comparator receiving the video signal as an actual value and comparing it to an adjustable predetermined reference value to create an output signal on an output, a servo-motor being connected to the output of the comparator and opening and closing the shutter aperture in response to the output signal of the comparator to vary the amount of light passing through the shutter aperture to the cavity.



4,688,088

POSITION DETECTING DEVICE AND METHOD

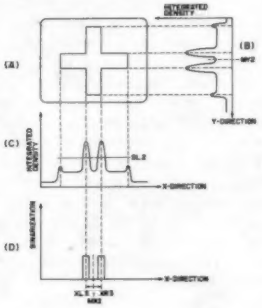
Bunei Hamazaki, Yokohama, and Naoki Ayata, Machida, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 15, 1985, Ser. No. 723,459

Claims priority, application Japan, Apr. 20, 1984, 59-78633; Apr. 20, 1984, 59-78634; Apr. 20, 1984, 59-78635

Int. Cl.[4] H04N 7/00, 7/18

U.S. Cl. 358—101 **6 Claims**



1. A device for detecting a mark having edges, said device comprising:

image pickup means for picking up an image of the mark and producing an image signal corresponding thereto;

extracting means having an extracting level for extracting a component from the image signal, each extracted component having a predetermined relation to the extracting level; and

control means for controlling the extracting level in accordance with the width and the number of the signal components extracted, so as to obtain signals corresponding to the edges of the mark.

4,688,089

CIRCUIT ARRANGEMENT FOR DETECTING MOTION IN A TELEVISION PICTURE

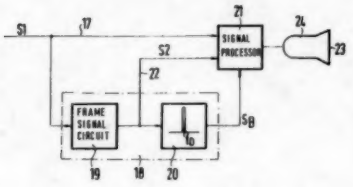
Dirk Uhlenkamp, Pforzheim, Fed. Rep. of Germany, assignor to Standard Elektrik Lorenz AG, Stuttgart, Fed. Rep. of Germany

Filed Jul. 15, 1986, Ser. No. 886,178

Claims priority, application Fed. Rep. of Germany, Jul. 25, 1985, 3526596

Int. Cl.[4] H04N 7/18

U.S. Cl. 358—105 **6 Claims**



1. A circuit arrangement for detecting an essentially horizontally directed motion of an edge in a television picture transmitted line by line over a vido-signal line using interlaced scanning, said arrangement comprising:

a frame line circuit connected to the vido-signal line and producing scanning lines which correspond to a frame formed from alternate lines of two fields; and

a narrow-band-pass filter circuit to which said scanning lines are fed and which has a pass frequency equal to the number of line pairs per frame formed from the corresponding lines of two fields of the frame multiplied by the number of frames per second.

4,688,090

VISION SYSTEM

Simon J. Veitch, "Ilderton", Mathoura, New South Wales 2710, Australia

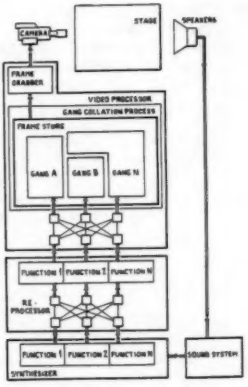
PCT No. PCT/AU85/00041, § 371 Date Nov. 6, 1985, § 102(e) Date Nov. 6, 1985, PCT Pub. No. WO85/04065, PCT Pub. Date Sep. 12, 1985

PCT Filed Mar. 6, 1985, Ser. No. 800,643

Claims priority, application Australia, Mar. 6, 1984, PG3924

Int. Cl.[4] H04N 7/18

U.S. Cl. 358—108 **8 Claims**



1. Apparatus for viewing a target area and for providing a reaction consequent on a changing image in the target area, said apparatus comprising

(a) means for viewing the target area and for creating video picture frame signals of the target area; and

(b) analyzing means for analyzing the signals relating to more than one discrete area within each picture frame, said analyzing means having feeding means for feeding control signals to a reaction providing means responsive to collective control signals generated during a single frame, to provide a change in said reaction consequent on there being an image change in the one or more discrete areas from an earlier frame, said analyzing means being dynamically alterable so that said discrete areas can be changed automatically to a succession of changing patterns over a plurality of successive picture frames consequent on there being a change occurring in the target area during a picture frame.

4,688,091

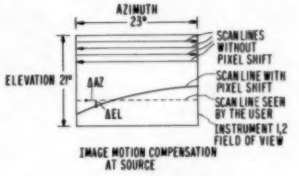
SPACECRAFT CAMERA IMAGE REGISTRATION

Ahmed A. Kamel, Sunnyvale; Donald W. Graul, San Mateo; Fred N. T. Chan, Atherton, and Donald W. Gamble, Palo Alto, all of Calif., assignors to Ford Aerospace & Communications Corporation, Detroit, Mich.

Filed May 6, 1986, Ser. No. 860,373

Int. Cl.[4] H04N 7/01

U.S. Cl. 358—109 **9 Claims**



1. Apparatus for limiting the error, to within a preselected limit, in the angular separation of corresponding pixels (with resptect to each other) of repeated images of the same selected imaging area of a spacecraft camera, said apparatus comprising:

on board the spacecraft, means for pointing the camera towards a scene external to the spacecraft;

at a location external to the spacecraft, means for determining long-term motion perturbations on the orbit and attitude of the spacecraft; and

coupled to said determining means, means for periodically communicating to a computer on board the spacecraft a representation of said long-term motion perturbations;

whereby the computer generates an image registration compensation signal in response to said representation, and sends said compensation signal to the pointing means.

4,688,092

SATELLITE CAMERA IMAGE NAVIGATION

Ahmed A. Kamel, Sunnyvale; Donald W. Graul, San Mateo; John Savides, Los Altos Hills, and Charles W. Hanson, Mountain View, all of Calif., assignors to Ford Aerospace & Communications Corporation, Detroit, Mich.

Filed May 6, 1986, Ser. No. 860,142

Int. Cl.[4] H06N 7/01

U.S. Cl. 358—109 **10 Claims**

1. Apparatus for locating any pixel within a satellite camera image in terms of latitude and longitude, said apparatus comprising:

a satellite in orbit around a celestial body;

an imaging camera on board the satellite for taking images of scenes on the celestial body, wherein each image is divided into a plurality of pixels;

modeling means which uses measurements taken by the cameras to generate an estimate of the satellite's orbit and an estimate of the camera's attitude; and

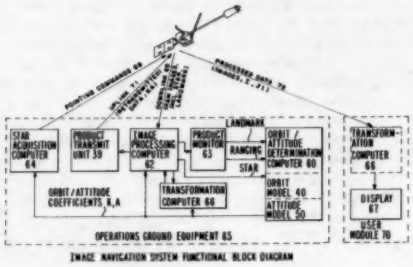


IMAGE NAVIGATION SYSTEM FUNCTIONAL BLOCK DIAGRAM

coupled to said modeling means, means for transforming pixel locations as announced by the camera into latitude and longitude coordinates with respect to the celestial body.

4,688,093

TRANSMISSION PROJECTION SCREEN AND METHOD OF MANUFACTURING SAME

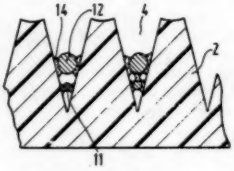
Caspert G. I. van der Staak, and Johannes C. van de Ven, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 30, 1986, Ser. No. 891,983

Claims priority, application Netherlands, Apr. 15, 1986, 8600944

Int. Cl.[4] G03B *21/60*

U.S. Cl. 350—128 **6 Claims**



1. A transmission projection screen comprising a transparent substrate having a front surface which is provided with mutually parallel ribs from which light issues during operation of the screen, grooves being present between the successive ribs, in which grooves an amount of light-absorbing particles is disposed whose average size is at least 20% of the width of the grooves measured halfway the depth of these grooves, characterized in that the light-absorbing particles in the grooves are divided into two layers, the first layer comprising particles having dimensions from 20 to 50% and the second layer comprising particles having dimensions from 75 to 125% of the width of the grooves measured halfway the depth of these grooves.

4,688,094

REFERENCE SIGNAL REPRODUCTION APPARATUS

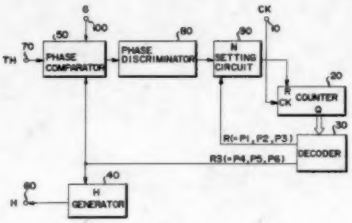
Toshiyuki Tanabe, Ageo, and Minoru Noguchi, Hanyu, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 27, 1985, Ser. No. 781,140

Claims priority, application Japan, Sep. 28, 1984, 59-201917; Sep. 28, 1984, 59-201918

Int. Cl.[4] H04N *5/04*

U.S. Cl. 358—148 **15 Claims**



1. A reference signal reproduction apparatus, comprising:

first counting means for dividing a reference clock by a dividing ratio and generating a count value;

reproduction reference signal generation means for decoding said count value and generating a reproduction reference signal;

phase comparing means for comparing the phases of said reproduction reference signal and an arriving reference signal to produce a phase comparison result;

phase discriminating means for discriminating whether the phase of said reproduction reference signal is advanced, delayed, or in-phase in relation to that of said arriving reference signal and producing a phase discrimination result, based on the phase comparison result of said phase comparing means; and

dividing ratio setting means for setting said dividing ratio so as to pull in the reproduction reference signal with said arriving reference signal based on the phase discrimination result of said phase discriminating means.

4,688,095

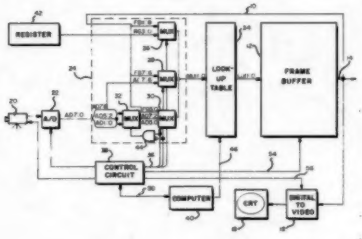
PROGRAMMABLE IMAGE-TRANSFORMATION SYSTEM

Mirza R. Beg, Andover; Julius Perl, Burlington, and Ronald D. Malcolm, Jr., Haverhill, all of Mass., assignors to Image Technology Incorporated, Woburn, Mass.

Filed Feb. 7, 1986, Ser. No. 827,155

Int. Cl.[4] H04N *5/14*

U.S. Cl. 358—160 **8 Claims**



1. An image-processing system comprising:

A. an image-signal source for generating digital source sig-

nals representing the intensities of source picture elements disposed in different locations in a source image;

B. a frame buffer, adapted for application thereto of data signals that represent data to be stored and including a plurality of frame-buffer locations corresponding to buffer picture elements disposed in different locations in a buffer image, for storing in the frame-buffer locations as pixel storage data the data represented by the data signals applied thereto, the frame buffer generating digital buffer signals representing the contents of the pixel storage data contained in the frame-buffer locations;

C. a conversion memory, including a plurality of addressable conversion-memory locations containing conversion data as contents thereof, and adapted for application thereto of address signals designating given conversion-memory locations, for applying to the frame buffer, as data signals, conversion signals representing the contents of the conversion-memory location addressed by the address signals applied thereto;

D. a multiplexer, connected to receive the source signals and the buffer signals and adapted for application thereto of selection signals that can assume different values that specify different combinations of bits of the received source and buffer signals, for forwarding to the conversion memory as the address signals, in accordance with different values of the selection signals, the combination of bits of the received source and buffer signals that the selection signals specify; and

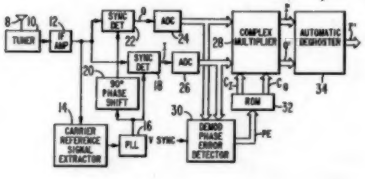
E. a control circuit for synchronizing operation of the image-signal source and the frame buffer so that the locations in the source and buffer images of the source and buffer picture elements, respectively, whose intensities are represented by the source and buffer signals, respectively, whose bits the multiplexer forwards as address signals to the conversion memory to designate a memory location whose contents are represented by given conversion signals are the same as the location in the buffer image of the buffer picture element corresponding to the frame-buffer location in which the frame buffer stores the data represented by the given conversion signals, whereby the multiplexer and conversion memory together establish a correspondence between conversion signals and combinations of source and buffer signals that can be changed by changing the values of the selection signals applied to the multiplexer.

4,688,096

DEMODULATION PHASE ERROR COMPENSATION CIRCUITRY AS FOR AN AUTOMATIC DEGHOSTING SYSTEM

Edward R. Campbell, III, Tabernacle, and Henry G. Lewis, Jr., Hamilton Square, both of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Jun. 25, 1986, Ser. No. 878,260
Int. Cl.[4] H04N 5/21
U.S. Cl. 358—167 **6 Claims**



1. In a system for processing radio frequency television signals having a direct signal component including a direct carrier signal and a delayed direct signal component including a delayed direct carrier signal and including means for synchronously demodulating said radio frequency television signals using reference signals that are respectively in-phase with and quadrature phase related to the vector sum of said direct carrier signal and said delayed direct carrier signal to obtain respective first and second baseband signals each having direct and delayed direct signal components, wherein the direct signal components of said first and second baseband signals may include reciprocal crosstalk distortion components, circuitry for reducing the magnitude of the crosstalk distortion components of said first baseband signal comprising:

means responsive to said first and second baseband signals for generating a phase difference signal being proportional to the difference in phase between said direct carrier signal and the vector sum of said direct carrier signal and said delayed direct carrier signal;

means responsive to said phase difference signal for generating a phase correction signal; and

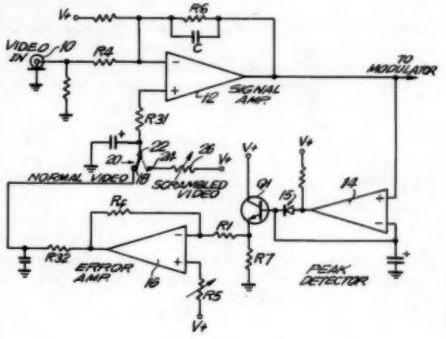
means coupled to said phase correction signal generating means for combining said phase correction signal and said first baseband signal to generate a modified first baseband signal having substantially reduced crosstalk distortion components.

4,688,097

D.C.-COUPLED VIDEO CLAMPING CIRCUIT

Wen T. Lin, Horsham, Pa., assignor to Jerrold Electronics Corp., New York, N.Y.

Filed Oct. 30, 1986, Ser. No. 924,880
Int. Cl.[4] H04N 5/18
U.S. Cl. 380—15 **3 Claims**



1. A d.c.-coupled video clamping circuit comprising an input terminal , a d.c. signal amplifier having a first input for receiving normal or scrambled video signals coupled to said input terminal; feedback means connected to the output of said signal amplifier, said feedback means including means for detecting the sync tip level of a normal video signal and an error amplifier coupled to the output of said detecting means for producing an error signal representative of variations in the sync tip level from a desired reference level; and control means effective when in a first condition, when it is desired to receive a normal video signal, to apply said error signal to a second input of said signal amplifier, and effective when in a second condition, when it is desired to receive a scrambled video signal, to connect a reference voltage to said second input of said signal amplifier.

4,688,098

SOLID STATE IMAGE SENSOR WITH MEANS FOR REMOVING EXCESS PHOTOCHARGES

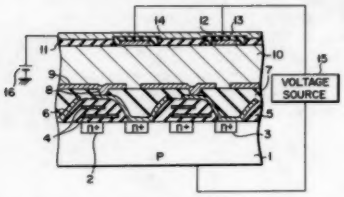
Takao Kon, Tokyo; Kensaku Yano, Yokohama; Masayuki Kakegawa, Chigasaki, and Hidenori Shibata, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 24, 1985, Ser. No. 813,466

Claims priority, application Japan, Dec. 24, 1984, 59-270688; May 27, 1985, 60-112115; Jun. 6, 1985, 60-121406; Oct. 11, 1985, 60-224655

Int. Cl.[4] H04N *3/14*

U.S. Cl. 358—213.19 **14 Claims**



1. A solid state image sensor having electrodes for controlling signal charges comprising:

a semiconductor structure having storage sections corresponding to pixels for storing charges and a transferring section for transferring the charges from said storage sections and converting the charges to an image output signal;

first electrodes each having one end connected to a corresponding storage section, said first electrodes being electrically insulated from said transferring section, and arranged at predetermined intervals to extend above said semiconductor substrate;

a first insulating layer formed on said first electrodes said insulating layer having a flat surface;

second electrodes formed on a surface of said first insulating layer at predetermined intervals and electrically connected to said first electrodes;

a photoconductive film formed on said second electrodes;

a barrier layer formed on said photoconductive film to form a barrier for said photo conductive film;

a light-transmitting third electrodes formed on said barrier layer; and

fourth electrodes formed on said photoconductive film and electrically insulated from said barrier layer and said third electrode said fourth electrodes being in ohmic contact with said photoconductive film and adapted to receive an external voltage applied thereto.

4,688,099

ILLUMINATION CONTROL CIRCUITRY FOR A FILM VIDEO PLAYER ELECTRONIC STROBE LIGHT

David L. Funston, Batavia, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 742,358, Jun. 7, 1985, abandoned. This application Dec. 19, 1986, Ser. No. 948,386

Int. Cl.[4] H04N *3/40, 5/253, 9/11*

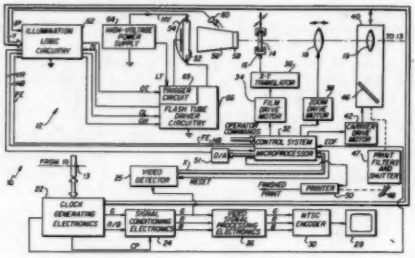
U.S. Cl. 358—214 **6 Claims**

1. In a film video player having a quenchable electronic strobe light for illuminating a solid state image sensor by way of projecting a pulse of light via a photographic film onto said image sensor during the vertical retrace interval of a standard television signal, the photographic film having an average density which potentially falls within a first given range above or a second given range below the average density of a properly exposed photographic film, and photosensitive means arranged to produce a light-dependent signal corresponding to the intensity of the light pulse produced by said electronic strobe light, the improvement wherein:

(a) logic switching means, operatively coupled to said electronic strobe light, for adjusting the amplitude and the duration of a flash-firing current through said electronic strobe light to adjust the intensity of the light pulse;

(b) electronic computer means, responsive to an output of said image sensor, for producing an exposure level signal which is functionally related to the density of the photographic film, and which is thereby functionally related to the energy of the light pulse projected onto said image sensor during the vertical retrace interval; and

(c) illumination control circuitry, operatively coupling sid electronic computer means, said photosensitive means,



and said logic switching means and responsive to the exposure level signal and to the light-dependent signal, for causing said logic switching means to adjust both the amplitude and the duration of the flash-firing current through said electronic strobe light to produce a series of light pulses of substantially constant energy at the vertical retrace rate of the standard television signal, the amplitude and the duration of the current being cooperatively controlled so that, whenever the average density of the photographic film is within the first or the second given range, the duration of each light pulse is adjusted so that it (1) is greater than a minimum acceptable duration below which the energy of the light pulse cannot accurately be repeated, and (2) is less than a maximum acceptable duration which is no greater than the vertical retrace interval.

4,688,100

VIDEO DATA ENCODING/DECODING APPARATUS

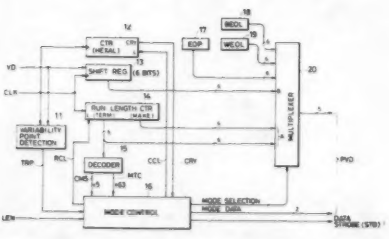
Tomoyuki Haganuma, Yokohama, and Yoji Kaneko, Machida, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 2, 1985, Ser. No. 783,010

Claims priority, application Japan, Oct. 8, 1984, 59-210694; Oct. 8, 1984, 59-210695

Int. Cl.[4] H04N *1/415*

U.S. Cl. 358—261 **14 Claims**



1. A video data encoding apparatus, comprising:

means for entering binary video signals each representing color of image;

means for discriminating whether or not binary video signals representing the same color of image continue in excess of a predetermined number of signals;

first generating means for generating code data, in the event that said discriminating means discriminates continuous binary video signals representing the same color of image in excess of the predetermined number of signals, said code data indicating the number of binary video signals entered until the color of image represented by the binary video signals changes, and the color of image represented by the continuous binary video signals; and

second generating means for generating the binary video signals, as code data, in the vent that said discriminating means discriminates binary video signals representing the same color of image, not exceeding the predetermined number of signals.

4,688,101

METHOD FOR ENGRAVING PRINTING CYLINDERS HAVING SEAMLESS JOINTS WITHIN REPEATED PATTERNS

Juergen Doelves, Heikendorf, and Wolfgang Schroedter, Kiel, both of Fed. Rep. of Germany, assignors to Dr.-Ing. Rudolf Hell GmbH, Fed. Rep. of Germany

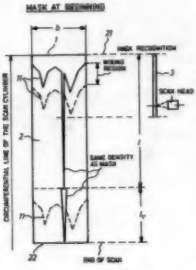
PCT No. PCT/DE85/00239, § 371 Date Mar. 7, 1986, § 102(e) Date Mar. 7, 1986, PCT Pub. No. WO86/00770, PCT Pub. Date Jan. 30, 1986

This PCT application Mar. 7, 1986, Ser. No. 857,763

Claims priority, application Fed. Rep. of Germany, Jul. 12, 1984, 3425626

Int. Cl.[4] H04N *1/21, 1/40*

U.S. Cl. 358—299 **7 Claims**



1. A method for production of a printing cylinder for seamless or endless patterns by printing form engraving machines having a scan cylinder and an engraving cylinder, a pattern original on said scan cylinder being opto-electronically scanned picture-element-wise along scan lines lying next to one another which proceed in a circumferential direction of said scan cylinder, and every scan line supplying information for an engraving line of a pattern repeat to be transferred onto the printing cylinder, comprising the steps of:

providing the pattern original being scanned longer than the pattern repeat and scanning the pattern original longer than the pattern repeat;

mixing image signals acquired by scanning a portion of the original extending beyond the pattern repeat with image signals acquired by scanning a beginning of the original, the image signals being mixed in a prescribable mixing region for generating a steady transition between signals at a beginning of the pattern repeat and signals at an end of the pattern repeat;

shifting by different amounts starting points for scanning individual scan lines of the original at the beginning of the original in a direction of the scan lines, said shifted starting points being a beginning of the mixing region extending from the respective starting point in the circumferential direction of the scan cylinder;

providing a control mask which has a width of the original, has an uneven-lined contour graduation over its width, and has a line guidance corresponding to a most favorable seam progression;

shifting the contour graduation of said control mask relative to the beginning of the original and defining the beginning of the mixing region;

electronically scanning the mask in a same fashion as the original along scan lines lying next to one another, a signal of each and every mask scan line appearing at a contour of the mask defining the starting point of the respective scan line of the original in combination with a mask recognition signal;

proceeding from the starting point of the scan lines, scanning and storing a same number of picture elements of the original on every image line of the original as corresponds to the pattern repeat;

continuing the scanning of the original from the end of the pattern repeat for every scan line of the original into an extension of the original for a distance corresponding to a length of the mixing region, and storing picture element signals thereby acquired; and

in the mixing region, combining the picture element signals of the original extension and of the beginning of the original for every scan line in accordance with a prescribed mixing function to form picture element signals having a new density information and, for engraving the printing cylinder, forming an overall repeat from the picture element signals resulting from mixing and unaltered picture element signals following thereupon from an end of the mixing region up to the end of the pattern repeat.

4,688,102

COLOR VIDEO SIGNAL MIXING SYSTEM

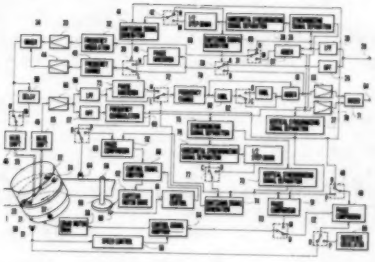
Hiroo Edakubo, Tokyo, and Kenichi Nagasawa, Kanagawa, both of Japan, assignors to Canon Kabushiki Kaisha

Filed Nov. 9, 1983, Ser. No. 550,486

Claims priority, application Japan, Nov. 11, 1982, 57-197937; Nov. 24, 1982, 57-205874

Int. Cl.[4] H04N *9/79*

U.S. Cl. 358—310 **21 Claims**



21. A color video signal mixing system, comprising:

(a) receiving means for receiving a plurality of color video signals at the same time, the plurality of color video signals each having an image information different from each other;

(b) separating means for separating a plurality of chrominance signals from the plurality of color video signals respectively;

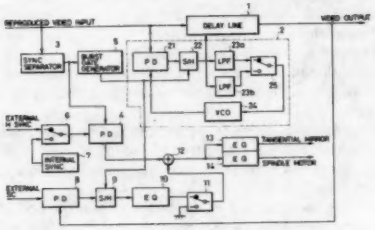
(c) selecting means for selecting one chrominance signal from said plurality of chrominance signals to obtain a selected chrominance signal; and

(d) control means for controlling the selecting action of said selecting means.

4,688,103
APPARATUS FOR THE COLOR SYNCHRONIZATION OF REPRODUCED VIDEO SIGNALS

Toru Akiyama, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Mar. 21, 1985, Ser. No. 714,325
Claims priority, application Japan, Mar. 21, 1984, 59-54051; Mar. 30, 1984, 59-62601
Int. Cl.[4] H04N *9/87*
U.S. Cl. 358—326 **7 Claims**



1. An apparatus for the color synchronization of reproduced video signals, said apparatus being capable of being placed in either an external or internal synchronization mode, said apparatus comprising:

control means for detecting a difference in phase between the output of an oscillation means and a reproduced color video signal in accordance with said detected phase difference, said control means comprising:

filter means whose frequency characteristic can be selected to a first frequency characteristic or a second frequency characteristic, said filter means being selected in first frequency characteristic for use in controlling said time base while said apparatus is in an external synchronization mode, said filter means being selected in second frequency characteristic for use in controlling said time base while said apparatus is in an internal synchronization mode; and

characteristic selection means for selecting said filter means into first or second frequency characteristic while said apparatus is in an external or internal synchronization mode respectively.

4,688,104
APPARATUS FOR PRODUCING A FULL RESOLUTION COLOR PHOTOGRAPHIC COPY OF A COLOR VIDEO SIGNAL

Dana W. Wolcott, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 16, 1985, Ser. No. 776,232
Int. Cl.[4] H04N *9/81, 5/84*
U.S. Cl. 358—332 **8 Claims**

1. Color video printer apparatus for producing a color photographic copy from a color video signal comprising:

monochrome electronic display means for displaying an image of a video signal;

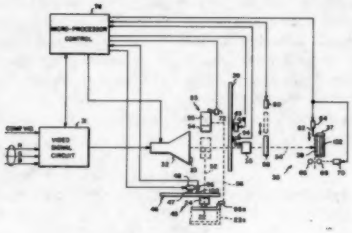
an exposure station located along an optical path from said display means;

video signal circuit means for providing a color video signal constituting frames of interlaced odd and even fields repeated at broadcast field frequency, wherein each field includes three concurrent color component video signals respectively representing first, second and third primary colors of a color field image;

a continuously movable color filter having filters corresponding to said first, second and third primary colors, said primary color filters being sequentially movable into said optical path in synchronism with said field frequency of said color video signal;

selectively actuatable gate means, electrically connected between said video signal circuit means and said display means, for applying to said display means one of the three concurrent color component video signals provided by said video signal circuit means; and

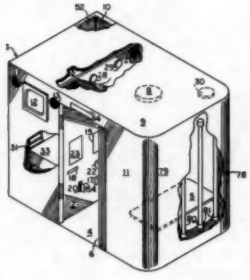
means for actuating said gate means in response to detection of said first primary color filter being moved into said optical path, to apply to said electronic display means a sequence of six consecutive color component video field signals constituting odd and even fields respectively of each of said first, second and third primary colors, in the color sequence of first primary color, second primary color, third primary color, first primary color, second primary color, third primary color, as respective corresponding color filters are sequentially moved into said optical path, such that said display means produces a sequence of six consecutive monochrome images which are filtered by respective corresponding primary color filters to expose a photographic element positioned at said exposure station to a sequence of six color field images constituting a full frame of a color video image.



4,688,105
VIDEO RECORDING SYSTEM

Arthur R. Bloch, 5966 Zinn Dr., Oakland, Calif. 94611, and Kenneth A. Bloch, 18441 Los Alimas St., Northridge, Calif. 91326

Filed May 10, 1985, Ser. No. 732,869
Int. Cl.[4] H04N *5/76*
U.S. Cl. 358—335 **62 Claims**



1. A self-service video system for enabling one or more users to produce a video recording with the user's image in combination with a selected prerecorded background sequence, and for vending the resulting video recording, comprising:

enclosure means for receiving at least one user in position to be video recorded;

a video camera in association with and oriented toward the enclosure means for use in making a video recording of the user:

background storage means for storing the selected prerecorded background sequence;

compositing means for positioning said selected prerecorded background sequence to appear in a composite picture with the user's image in the video recording to be produced;

video recording means, including means for recording the composite image on a vendable video recording medium for a preselected interval;

audio recording means for mixing and recording onto the video recording medium (a) audio from the selected prerecorded background sequence and (b) audio input from the user; and

vending means for presenting to the user a completed video recording on said vendable video recording medium, after completion of production of the recording.

4,688,106

VIDEO PROCESSING SYSTEM USING MULTI-HEAD DISC STORE

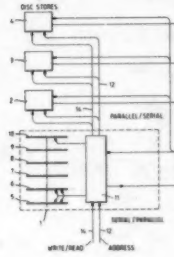
Paul R. N. Keller, Newbury; Robin A. Gawley, Ball Hill, and Ian M. Stewart, Newbury, all of England, assignors to Quantel Limited, Kenley, Great Britain

Filed Feb. 11, 1985, Ser. No. 700,189

Claims priority, application United Kingdom, Mar. 29, 1984, 8408113

Int. Cl.[4] G11B *27/02*

U.S. Cl. 358—342 **5 Claims**



1. A video signal processing system comprising:

disc store means having a plurality of storage discs having the combined capacity for storing video signals for a relatively large number of pictures and having a plurality of groups of transducing heads to selectively read and write video signals in predetermined picture storage positions on the storage discs and circuit means for rendering the heads of a selected group operable in parallel for video signals in bit serial mode;

frame store means comprising a plurality of framestores having the capacity for storing video signals in bit parallel mode for a relatively small number of pictures;

a first transfer channel for transferring sequential video signals having a predetermined pixel frequency from an external circuit to said frame store means, and vice versa;

said framestores being each arranged for parallel reading and writing in a plurality of address locations thereof equal in number to the number of heads in a group; a highway having a plurality of channels and circuit means for connecting the heads in a selected group via said channels to the respective addresses of a selected framestore in parallel and for reading video signals from said framestore and applying them to respective heads and vice versa, wherein the signals for said highway are converted from bit parallel to bit serial mode or vice versa as required, and video signals can be transferred at such a rate as to enable the transfer of a picture to or from the disc store means in a time not exceeding that required to transfer a picture in said first channel.

4,688,107

INFORMATION RECORDING AND REGENERATING SYSTEM

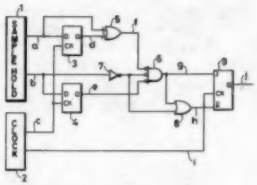
Sumio Hosaka, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Mar. 28, 1985, Ser. No. 716,994

Claims priority, application Japan, Mar. 30, 1984, 59-62621

Int. Cl.[4] H04N *5/76*

U.S. Cl. 358—342 **4 Claims**



1. A device for producing a first control signal adapted for controlling the operation of a video disk player to inhibit certain operations thereof if the disk player is in one of a first set of predetermined regeneration modes or a second control signal adapted for controlling the operation of the video disk player to enable the certain operations, thereof if the disk player is in one of a second set of predetermined regeneration modes, the device being adapted to receive a video signal including a regeneration control signal having a series of frame signal components and first and second field signal components associated with each of the frame signal components, each of the frame signal components and the field signal components having a first signal value or a second signal value, the device comprising:

means adapted for receiving the video signal and for outputting a frame signal component separately from the first and second field signal components associated therewith;

first means, coupled to said receiving means and receiving said frame signal components therefrom, for determining if successively received frame signal components have different signal values;

second means, coupled to said receiving means and receiving said first and second field signal components therefrom, for determining if said first and second field signal components associated with one of said frame signal components have said first signal value and said second signal value, respectively; and

means, coupled to said first means and said second means, for generating said first control signal if one of said frame signal components is determined to have said first value and the second field component associated with said one frame signal component is determined to have said first value, and said second control signal if the transition from one of said frame signal components having said first signal value to the next succeeding frame signal component having said second signal value occurs at the time of a transition from said first field component associated with said one frame signal component to said second field component associated with said next succeeding frame signal component.

4,688,108

HIGH RESOLUTION GRAPHICS SYSTEM FOR VIDEO/TELECONFERENCING SYSTEMS

Robert V. Cotton, Chalfont, and Edward J. Klodnicki, Lansdale, both of Pa., assignors to Teleconference Systems, Inc., Horsham, Pa.

Filed Oct. 11, 1985, Ser. No. 786,673

Int. Cl.[4] H04N *1/32, 1/419, 1/42*

U.S. Cl. 358—257 **7 Claims**

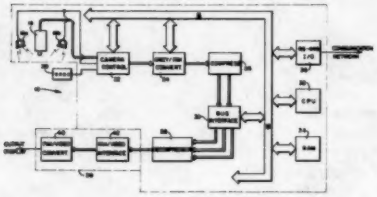
1. A high resolution graphics system for video-conferencing, comprising:

stationary document scanning means for optically scanning a document without any portion having a mechanical movement relative to said document and for outputting a facsimile signal representative of the document, said stationary document scanning means designed to generate said facsimile signal by way of a series of first and second signal elements;

facsimile signal compression means responsive to said facsimile signal for compressing said facsimile signal in accordance with a run length coding algorithm;

main memory means for storing compressed facsimile signals;

communication system interface means for accepting said facsimile signal in compressed form and transmitting the same to a remote location;



system control means for providing control signals and for receiving status signals to respectively control and monitor the operations of each of: said document scanning means; said facsimile signal compression means; said main memory means; and said communication system interface means; and

system interconnection means for interconnecting each of said system control means, said document scanning means, said facsimile signal compression means, said main memory means, and said communication system interface means, all with each other whereby a signal flow path is provided for carrying control, status, and facsimile signals.

4,688,109

HELICAL SCAN TRACKING APPARATUS INCLUDING MEANS FOR CORRECTING FOR TRACK CURVATURE

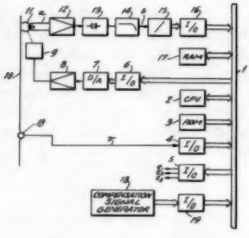
Isao Sangu, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Apr. 4, 1984, Ser. No. 596,710

Claims priority, application Japan, Apr. 4, 1983, 58-58884

Int. Cl.[4] G11B *5/58, 21/10;* H04N *5/783*

U.S. Cl. 360—10.2 **9 Claims**



1. A scan tracking apparatus for a helical scan video tape recorder, comprising:

head means for sequentially scanning a plurality of video tracks formed on a magnetic tape to produce a reproduced video signal representative of information contained in said video tracks, said video tracks having a curvature characteristic, said head means including a signal reproducing head and means for deflecting said head transversely to said video tracks in response to a deflection signal applied thereto;

means for producing a first control signal having a sawtooth shape, said first control signal varying as a function of tape speed;

means responsive to said reproduced video signal for producing a second control signal by correlating reproduced video signals obtained from previously scanned video tracks;

means for storing a plurality of different curvature correction signals, said curvature correction signals each corresponding to a respective possible video track curvature characteristic;

means for selecting and retrieving one of said stored curvature correction signals, said selected signal corresponding to said curvature characteristic of said video tracks;

means responsive to said selected signal for producing a third control signal; and

means for generating said deflection signal as a function of said first, second and third control signals.

4,688,110

METHOD AND APPARATUS FOR RECORDING A VIDEO SIGNAL WITHOUT LOSS OF A SOUND SIGNAL RECORDED ON THE SAME TRACKS

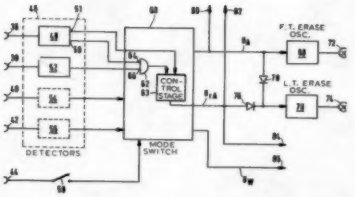
Walter Fricke, Wesseln, Fed. Rep. of Germany, assignor to Blaupunkt-Werke GmbH, Hildesheim, Fed. Rep. of Germany

Filed Jun. 3, 1985, Ser. No. 740,558

Claims priority, application Fed. Rep. of Germany, Jun. 7, 1984, 3421197

Int. Cl.[4] G11B *5/782*

U.S. Cl. 360—19.1 **7 Claims**



1. Method of recording a composite television signal on a Hi Fi video recorder which is equipped not only with video heads, a synchronizing head and a longitudinal-track sound head, but also with oblique-track sound heads and comprises also a full-track erase head, a video detector and means for interposing operation in playback mode before beginning recording for synchronizing sources of video signals to be recorded before actual recording thereof, said method including, during passage of a tape of a video cassette through said video recorder, the steps of:

interposing operation in playback mode, including normal operation of said synchronizing head and synchronizing circuits responsive thereto as well as normal operation of said oblique-track sound heads, for an interval preceding recording, for observing the output of said video detector;

detecting during said interval whether or not sound carrier signals are reproduced by said oblique-track sound heads, and

in the event of no detection of a video signal and detection of a sound carrier signal, disabling said oblique track sound heads and said full-track erase head not later than the end of said interval, when return to a recording mode occurs, and also thereafter blocking the recording of new synchronizing signals while maintaining the normal operation of said synchronizing head and synchronizing circuits responsive thereto in the same manner as in the playback mode, for thereafter recording video signals without ren-

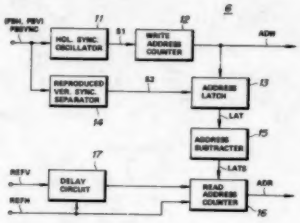
dering unusable the underlying sound signals, on oblique-tracks on said tape.

4,688,111

TIME BASE CORRECTOR

Tetsuo Kani, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Sep. 19, 1985, Ser. No. 777,733
Claims priority, application Japan, Sep. 27, 1984, 59-202221
Int. Cl.[4] H04N *5/94, 5/95*
U.S. Cl. 360—36.2 **4 Claims**



1. A time base corrector for correcting time base fluctuations in a reproduced video signal comprising:

address generator means;

means for storing the reproduced video signal in response to a write address designation signal generated by said address generator means in response to a horizontal synchronizing signal in said reproduced video signal;

means for latching the write address designation signal in synchronization with a vertical synchronizing signal in said reproduced video signal;

means for loading the latched address designation signal as a read-start address designation signal in synchronization with a reference vertical synchronizing signal; and

means for reading the stored reproduced video signal from said means for storing beginning from a read-start address designated by the read-start address designation signal, in which said address generator means includes:

(a) means for subtracting a predetermined number of addresses from the number of the address designated by the latched address designation signal; and

(b) means for applying the resultant subtracted number of the address as a read-start address to said stored reproduced video signal reading means.

4,688,112

POWER-SAVING DATA TRANSFER APPARATUS WITH A FLEXIBLE MAGNETIC DISK OR THE LIKE

Makoto Shoji, Fussa; Hiroshi Tsuyuguchi, Tokyo; Shozo Toma, Kokubunji; Kazuhiro Hiraki, Mitaka, and Tsutomu Morita, Musashino, all of Japan, assignors to Teac Corporation, Tokyo, Japan

Filed Feb. 26, 1985, Ser. No. 705,561
Claims priority, application Japan, Mar. 2, 1984, 59-40127
Int. Cl.[4] G11B *15/04, 15/12*
U.S. Cl. 360—60 **6 Claims**

1. A data transfer apparatus for use with a disklike record medium such as a flexible magnetic disk having data storage tracks thereon, the apparatus comprising:

(a) a disk drive motor for imparting rotation to the record medium;

(b) a transducer for data transfer with the record medium;

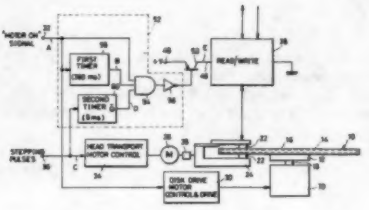
(c) a head transport motor for transporting the transducer radially of the record medium to enable the transducer to access the individual data storage tracks on the record medium;

(d) a read/write circuit connected to the transducer for processing data transferred between the transducer and the record medium;

(e) power supply means;

(f) a power control switch connected between the power supply means and the read/write circuit for the on/off control of power fed from the former to the latter; and

(g) a switch control circuit for holding the power control switch open at least when the disk drive motor is out of rotation and when the head transport motor is in rotation,



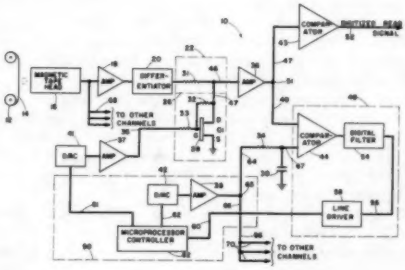
and for holding the power control switch closed at least during the progress of data transfer between the transducer and the record medium, said switch control circuit being further adapted to hold the power control switch open from the moment the disk drive motor is set into rotation to the moment the speed of rotation of the disk drive motor builds up to a prescribed percentage of a normal speed at which data transfer is effected between the transducer and the record medium.

4,688,113

APPARATUS FOR CALIBRATING TAPE DRIVE READ SYSTEM

Dale W. Parsons, Tulsa, Okla., assignor to Telex Computer Products, Inc., Tulsa, Okla.

Filed Oct. 1, 1985, Ser. No. 782,987
Int. Cl.[4] G11B *5/02, 27/36*
U.S. Cl. 360—67 **3 Claims**



1. Apparatus for calibrating a tape drive read system, comprising:

(a) a read system amplifier channel comprising, in series, a first amplifier, a differentiator, a voltage controlled attenuator (VCA), and a second amplifier;

(b) first comparator means for forming a digital signal of amplitude equal to that of the analog output of said second amplifier;

(c) control means to produce a variable D.C. voltage which is applied to said VCA to control the attenuation thereof; and

(d) second comparator means with a first input connected to said output of said second amplifier, and a second or reference input connected to a source of voltage of se-

lected magnitude, the second comparator providing a sensor means to determine when the signal on the output of said second amplifier is equal to a selected voltage, and to communicate this condition to said control means, which will then stop varying the D.C. voltage applied to said VCA,

whereby the gain of said read system will be of the proper value to provide the calibrated analog output from said second amplifier.

4,688,114

DRUM SERVO CIRCUIT

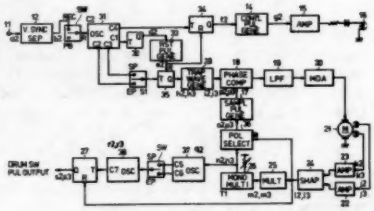
Yoshio Tokuyama, Yokohama, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Jun. 5, 1986, Ser. No. 870,843

Claims priority, application Japan, Jun. 6, 1985, 60-123217; Jun. 6, 1985, 60-123218

Int. Cl.[4] G11B *21/04*

U.S. Cl. 360—70 **9 Claims**



1. A drum servo circuit for a magnetic recording and/or reproducing apparatus which records and/or reproduces a video signal on and/or from a magnetic tape by use of video heads mounted on a rotary body which is driven by a motor, said rotary body being mounted with first and second pairs of video heads one pair of which is selectively used depening on a play mode of the magnetic recording and/or reproducing apparatus, said first and second pairs of video heads being mounted on said rotary body at such positions that said first pair of video heads lags said second pair of video heads by a predetermined angle in a rotational direction of said rotary body, said first pair of video heads being used in a first play mode, said second pair of video heads being used in a second play mode, said drum servo circuit comprising:

counter means reset by a vertical synchronizing signal of the video signal for counting clock pulses and producing a pulse signal having a predetermined frequency at the time of a recording, said counter means running free at an oscillation frequency equal to said predetermined frequency at the time of a reproduction;

first circuit means for producing a first signal when a counted value in said counter means reaches a first threshold value in said first play mode, and for producing a second signal in said second play mode when the counted value in said counter means reaches a second threshold value after a predetermined time from a time when said first threshold value is reached, said predetermined time being in correspondence with said predetermined angle;

rotation detecting means for producing a rotation detection signal by detecting a rotation of said rotary body;

second circuit means for producing a third signal from said rotation detection means;

third circuit means for producing a phase error signal by comparing the phase of said first signal and the phase of said third signal in said first play mode and by comparing the phase of said second signal and the phase of said third signal in said second play mode; and

driving circuit means for driving said motor responsive to said phase error signal.

4,688,115

APPARATUS FOR REPRODUCING A DIGITAL SIGNAL

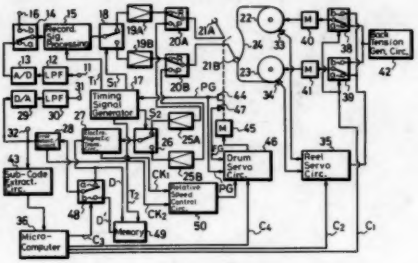
Toshihiko Takahashi, Chiba; Yoshizumi Inazawa; Toshiyuki Tani, both of Kanagawa, and Shigeyuki Satomura, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Mar. 21, 1986, Ser. No. 842,251

Claims priority, application Japan, Apr. 5, 1985, 60-72197

Int. Cl.[4] G11B *5/52, 15/14*

U.S. Cl. 360—70 **8 Claims**



1. Apparatus for reproducing digital signals recorded on a recording tape, comprising:

rotary head means in scanning relation to the recording tape for generating reproduced digital signals in response to said digital signals recorded on the tape;

drive means for transporting said tape past said head means and for rotating said head means so that a relative speed is established between said head means and said tape;

mode-selecting means for controlling said drive means so that the tape is selectively transported in first and second directions at an absolute tape speed that can be varied in correspondence with selected operating modes of the apparatus;

servo-means for adjusting the rotational speed with which said drive means rotates the head means in correspondence with variations of said absolute tape speed so that said relative speed is maintained at a substantially constant value for all of said operating modes of the apparatus; and

control means for causing said drive means to normally effect said rotating of the head means in a normal direction and to effect said rotating of the head means in a reverse direction during transporting of said tape at a high absolute speed in one of said first and second directions.

4,688,116

APPARATUS FOR RECORDING AND/OR REPRODUCING DIGITAL SIGNAL

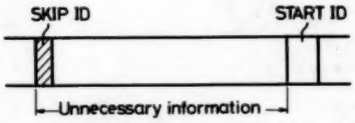
Toshihiko Takahashi, Chiba, and Hirohito Kawada, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 1, 1986, Ser. No. 858,023

Claims priority, application Japan, May 29, 1985, 60-116213

Int. Cl.[4] G11B *15/06, 23/36, 27/28*

U.S. Cl. 360—72.2 **3 Claims**



1. An apparatus for recording and/or reproducing a program information signal comprising:

a recording medium on which at least a program information signal and a program start signal indicative of the start of said program information signal are recorded; transport means for controlling the transport of said recording

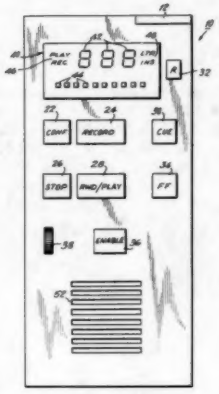
medium; means for reproducing said program information signal recorded on said recording medium; and means for recording a skip identifying code signal indicative only of a start portion of an unnecessary program information on said recording medium.

4,688,117

DISPLAY INCLUDING VARIABLE MODE FOR A RECORD AND/OR PLAYBACK DEVICE

John J. Dwyer, Stratford; Jeremy Saltzman, Norwalk, and Betsy Hipp, Orange, all of Conn., assignors to Dictaphone Corporation, Rye, N.Y.

Filed Dec. 21, 1983, Ser. No. 564,480
Int. Cl.[4] G11B *15/18, 27/13, 27/34*
U.S. Cl. 360—72.3 **48 Claims**



46. In a record and/or playback device having an addressable memory and moving means for moving an addressable memory and moving means for moving a bi-directional movable record medium on which messages are recorded, a method of locating respective messages comprising the steps of storing location counts in successive memory addresses representing the respective locations at which messages are recorded on said record medium; moving the medium; providing a position count representing the present position of said record medium; comparing the provided position count of said record medium to the stored location counts of said messages; indicating a positive comparison of said position count to a location count, thereby locating a respective message; updating a memory address in response to a positive comparison; deriving a message number count from said updated memory address; and displaying the message number count of the respective message that had been located.

4,688,118

SERVO GAIN COMPENSATION IN A DISC DRIVE

Vernon L. Knowles; Roger V. Wilcox, and Bruce J. Jackson, all of Boise, Id., assignors to Hewlett-Packard Company, Palo Alto, Calif.

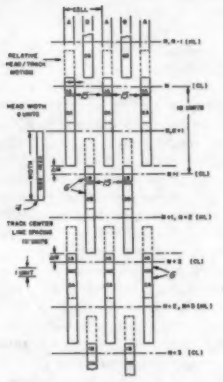
Filed Jul. 1, 1986, Ser. No. 880,973
Int. Cl.[4] G11B *5/012*
U.S. Cl. 360—75 **22 Claims**

1. A magnetic disc memory drive in which individual magnetic heads exhibit substantially the same servo gain, comprising:

a. a plurality of rotatable magnetic memory discs each having a surface of magnetic material;

b. a movable magnetic head assembly, including individual magnetic heads of differing widths, for moving each magnetic head substantially radially over an adjacent disc surface; and

c. magnetic servo code recorded by the individual magnetic



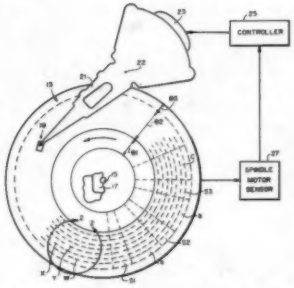
heads in tracks on said magnetic memory discs in servo code patterns in which each magnetic head overlaps substantially the same amount of magnetic servo code for minimizing variations in servo gain among the heads.

4,688,119

DETECTION AND AMPLIFICATION CIRCUIT

Norman S. Blessum, Thousand Oaks, Calif., assignor to Xebec Development Partners, Ltd., San Jose, Calif.

Filed Nov. 20, 1985, Ser. No. 800,063
Int. Cl.[4] G11B *5/56*
U.S. Cl. 360—77 **24 Claims**



1. A system for controlling the movement of a read/write transducer associated with a magnetic disk drive system in which the read/write transducer is driven to move acorss the face of a rotating disk having equally spaced-apart servo sectors formed on the face of the disk, each of the servo sectors containing groups of marker pulses with the pulses arranged such that any group of three adjacent marker pulses spans two concentric tracks on the face of the disk and each of said pulses produces a high frequency sinusoidal signal when read by the read/write transducer, comprising:

a. amplifying means to rectify and amplify the high frequency sinusoidal signals used by said transducer;

b. sampling means to sample and hold at least three values representative of the amplified high frequency sinusoidal signals;

c. synchronizing means to synchronize the sample-and-hold

means such that the first value sampled and held is representative of the amplitude of the first pulse read in a servo sector, the second value sampled and held is representative of the amplitude of the second pulse read in the servo sector, and the third value sampled and held is representative of the amplitude of the third pulse read in the servo sector;

d. multiplexing means connected to the synchronizing means and to the sampling means to provide multiplexed signals sequentially representative of the first value sampled and held, followed by the second value sampled and held, followed by the third value sampled and held, and

a current mirror circuit connected to the amplifying means to provide, at the output of the amplifying means, constant current equaling the current produced by said amplifying means when no high frequency sinusoidal signal is received by the amplifying means,

the current mirror circuit including isolating means connected to the amplifying means to provide constant current thereto independent of changing current produced by the amplifying means,

said isolating means comprising an isolating transistor connected in the common base configuration, with said isolating transistor having its emitter connected to receive current from said current mirror and its collector connected to the amplifying means.

4,688,120

MAGNETIC TAPE APPARATUS WITH INTEGRATED CONTROL MECHANISM

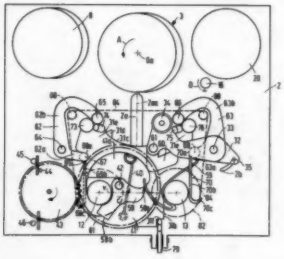
Johannes C. A. Muller, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 1, 1985, Ser. No. 793,940

Claims priority, application Netherlands, Apr. 9, 1985, 8501028

Int. Cl.[4] G11B *5/027, 5/008*

U.S. Cl. 360—85 **30 Claims**



1. A magnetic-tape apparatus comprising a deck carrying a cylindrical drum system provided with at least one rotatable magnetic head, on which deck a sliding plate carrying at least two mutually spaced first tape guides is guided for rectilinear movement towards and away from the drum system, a movement of the sliding plate from an initial position towards the drum system causing a length of magnetic tape to be led towards the drum system, after which movement when the sliding plate is in an end position the magnetic tape is wrapped around a part of the circumference of the drum system by said first tape guides, which deck also carries two mutually spaced winding spindles for winding and unwinding the magnetic tape respectively, characterized in that the sliding plate is provided with

positioning means which position the first tape guides relative to the drum system in the end position of the sliding plate,

first control means which control two pivotal arms which are arranged on the deck and which carry second tape guides,

second control means which control a pressure-roller lever which is arranged on the deck and which carries a pressure roller, and

third control means which control an idler wheel for driving a first winding spindle or a second winding spindle.

4,688,121

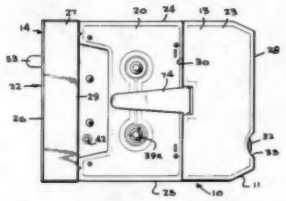
CASSETTE ADAPTOR FOR 8-TRACK CARTRIDGE TAPE PLAYER

John F. Castagna, Brooklyn, N.Y., assignor to Sparkomatic Corporation, Milford, Pa.

Continuation of Ser. No. 809,834, Dec. 12, 1985, abandoned, which is a continuation of Ser. No. 494,417, May 13, 1983, abandoned. This application Nov. 13, 1986, Ser. No. 930,096

Int. Cl.[4] G11B *15/00*

U.S. Cl. 360—94 **20 Claims**



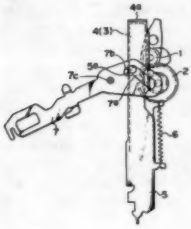
1. An adaptor for playing a magnetic tape cassette in a tape player for endless tape cartridges, comprising an adaptor housing whose horizontal width and depth dimensions and peripheral shape adjacent the bottom thereof are substantially the same as that of the endless tape cartridge and having substantially a "U" shaped profile in vertical side elevation providing an intermediate upwardly opening well for receiving a magnetic tape cassette flanked by front and rear housing portions transversely spanning the adaptor, a tape driving capstan in the housing for driving the cassette tape, capstan drive means for selectively driving said capstan from the tape drive of the cartridge player including a pivoted power takeoff lever having a rotatable wheel means carried thereby movable to driven and non-driven positions to couple and decouple the same with said tape drive, a function control lever pivoted in said housing having an end portion movable to and from a position relative to said takeoff lever to position the same at said non-driven position and release it to assume said driven position, positioning means releasably restraining said function lever at Play and Stop positions, an elongated automatic stop tape sensor lever rotatable about a pivot post within the housing have a sensor tip formation at one end thereof engaging the cassette tape and activated thereby when the tape is fully unwound from the supply reel of the cassette to force the sensor lever to a stop position, and means engaged by a second end of said sensor lever at an end thereof opposite said one end responsive to movement of said sensor lever to said stop position to activate said positioning means when restraining said function lever at Play position and effect pivotal shifting of the function lever to Stop position.

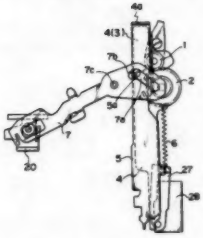
4,688,122

RELEASABLE CONNECTION ARRANGEMENT OF A LOADING AND/OR EJECTION MECHANISM IN A TAPE PLAYER

Kazuki Takai; Yukio Ito; Shigeo Kinoshita; Junichi Kikuchi, and Toshihiko Fukazawa, all of Tokyo, Japan, assignors to Clarion Co., Ltd., Tokyo, Japan

Filed Dec. 23, 1985, Ser. No. 812,154
Claims priority, application Japan, Dec. 28, 1984, 59-274932; Dec. 28, 1984, 59-274933
Int. Cl.[4] G11B *15/00, 17/00*
U.S. Cl. 360—96.5 7 Claims





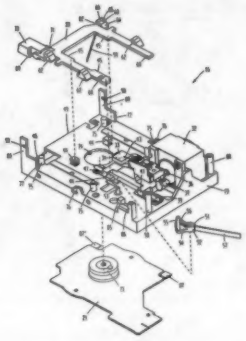
1. A tape pack moving mechanism for a tape player, comprising pack transport means for engaging and effecting movement of a tape pack within the tape player, a motor, and link means for drivingly coupling said motor to said pack transport means, said link means including a first movably supported link part, a second movably supported link part, first means for drivingly coupling said motor to said first link part so as to effect movement thereof, second means for drivingly coupling said second link part to said pack transport means, and third means for facilitating an operative coupling of said first and second link parts so as to effect movement of said second link part in response to movement of said first link part when a minimum force which said first link part must exert on said second link part in order to effect movement thereof is less than a predetermined value and for interrupting said operative connection between said first and second link parts when said minimum force is in excess of said predetermined value, said third means including said first and second link parts being supported for relative movement and said first link part moving in a first direction relative to said second link part when said minimum force exceeds said predetermined value, and said third means including resilient means for urging movement of said first link part in a second direction opposite said first direction relative to said second link part.

4,688,123

CARTRIDGE HANDLING DEVICE AND METHOD

Gary L. Sokol; Michael J. Steen, both of Longmont, and Douglas A. Stephen, Boulder, all of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 13, 1985, Ser. No. 744,428
Int. Cl.[4] G11B *17/04*
U.S. Cl. 360—97 19 Claims



1. A cartridge handling device for positioning a cartridge that includes a casing having a flexible diskette therein, said casing also having a central aperture for enabling driving of said diskette therethrough, head access means in one portion, notch means in an edge of said one portion, and a moveable shutter at said one portion covering said head access means and notch means when in a closed position and uncovering said head access means and notch means when in an open position, said cartridge handling device comprising:

carrier means having a cartridge receiving area for receiving said cartridge when inserted into said cartridge area in a predetermined cartridge inserting direction;

support means having said carrier means mounted thereon, said support means and said carrier means having cooperable engaging members that are slideable with respect to one another for establishing loading and unloading directions of movement of said carrier means relative to said support means between predetermined cartridge unloaded and loaded positions;

actuating means for causing movement of said carrier means in said loading and unloading directions;

first positioning means connected with said carrier means for engaging at least one of said edge of said cartridge casing and said shutter thereon during a first portion of inserting movement as said cartridge is inserted into said cartridge area when said carrier means is in said cartridge unloaded position, and, responsive to a second portion of inserting movement of said cartridge following said first portion of inserting movement of said cartridge, causing movement of said shutter from said closed position to said open position to permit engagement of said first positioning means with said notch means in said edge of said cartridge casing; and

second positioning means connected with said support means to enable said carrier means to slide in said loading direction to the cartridge loaded position responsive to a third portion of inserting movement of said cartridge following said second portion of inserting movement of said cartridge, said first positioning means precluding movement of said carrier means to the cartridge loaded position if said first positioning means does not engage said notch means in said cartridge casing.

4,688,124

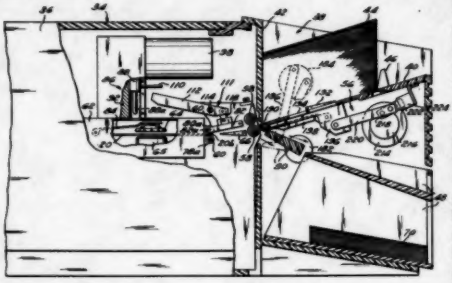
AUTOMATED FLOPPY DISK DRIVE LOADER

Richard A. Scribner, Fullerton, and James A. Norton, Orange, both of Calif., assignors to Media Systems Technology, Inc., Irvine, Calif.

Continuation-in-part of Ser. No. 377,196, May 11, 1982, abandoned. This application Feb. 6, 1985, Ser. No. 698,634

Int. Cl.[4] G11B *5/012, 5/016*

U.S. Cl. 360—99 **22 Claims**



1. A mechanism for loading and unloading floppy disks each of which consists of a disk rotatably mounted in a jacket into a disk drive, comprising:

roller means for positively positioning the floppy disk in said disk drive, said roller means engaging said floppy disk until said floppy disk is accurately positioned in said disk drive so that said floppy disk is accurately positioned with minimal damage to said floppy disk;

means for disengaging said roller means from said floppy disk subsequent to said accurate positioning so said disk can be unobstructively rotated within said jacket and for re-engaging said roller means with said floppy disk when said rotation ceases;

drive means for rotating said roller means in two directions to feed said floppy disk into, and remove said floppy disk from, said disk drive; and

a frame supporting said roller means and said drive means.

4,688,125

ARRANGEMENT OF PUSH-BUTTON CONTROLLED FLOPPY DISC DEVICE

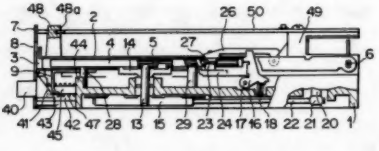
Reishi Nomoto, No.2758-4, Aza-Nishi-Kanamaru, Negoya, Tsukui-machi, Tsuki-gun, Kanagawa-ken, and Yoshiaki Ozaki, No.400-1, Nishiterakata-machi, Hachioji-shi, Tokyo, both of Japan

Filed Mar. 5, 1985, Ser. No. 708,332

Claims priority, application Japan, Nov. 13, 1984, 59-171063[U]

Int. Cl.[4] G11B *17/02, 17/035*

U.S. Cl. 360—99 **1 Claim**



1. A floppy disc drive having a base plate defining a front end and a rear end, an elongated disc cassette carrier defining an open front end for receiving a disc cassette therein, and a rear end; the rear end of the disc cassette carrier being pivotally connected to the rear end of the base plate, means for moving the disc cassette carrier between an upper charging or discharging position in which the disc cassette may be inserted into or retrieved from the disc cassette carrier and a lower operative position in which a floppy disc contained in the disc cassette engages a drive element, said floppy disc drive comprising: a circuit board for electrically controlling a data recording or reproducing operation of the floppy disc drive; a plurality of support arms secured to the front and rear ends of the base plate to support said circuit board above said disc cassette carrier; said disc cassette moving means including an ejection button having a front part formed with laterally deformable abutment hooks and an attaching assembly mounted on said base plate at the front end thereof, said ejection button being pressed to move said disc cassette carrier from the lower operative position to the upper charging or discharging position; said attaching assembly including a stopper wall provided on the front end of said base plate and having an opening for receiving the front part of the ejection button, an end wall provided on said base plate in a spaced relation to said stopper wall, and side walls spaced from each other and extending transversely between said stopper wall and said end wall to guide a rear part of said ejection button; spring means provided between said ejection button and said end wall, said spring means normally pressing said abutment hooks on the ejection button against said stopper wall; and a non-functional bezel attached to the front end of said base plate, said bezel consisting of a flat frame defining an opening for receving said front part of the ejection button, and a slot for the disc cassette.

4,688,126

TAPE GUIDE ARRANGEMENT FOR HELICAL SCAN MAGNETIC RECORDING AND PLAYBACK APPARATUS

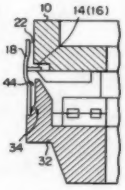
Kimio Ogawa, Yokohama, Japan, assignor to Victor Company of Japan, Limited, Yokohama, Japan

Filed Jan. 14, 1985, Ser. No. 691,341

Claims priority, application Japan, Jan. 23, 1984, 59-9701

Int. Cl.[4] G11B *15/60*

U.S. Cl. 360—130.24 **7 Claims**



1. A tape guide arrangement installed in a magnetic recording and playback apparatus for guiding a magnetic tape being transported, comprising:

a rotatable drum member provided with a rotary magnetic head; and

a stationary drum member coaxially and operatively associated with said rotatable drum member and provided with tape transport regulating means for guiding the tape such that the tape runs helically wrapping around the rotatable and stationary drum members over a predetermined angular range;

said tape transport regulating means having tape positioning means for guiding the tape and positioning the tape with respect to height, said tape positioning means comprising a stepped portion including an abutment surface which extends parallel to the tape transport direction and which abuts one edge of the tape, and tape guide means comprising a tape non-contact surface portion which faces a surface of the tape and which extends in a transverse direction of the tape, said tape non-contact surface portion being spaced from the surface of the tape to define an air gap therebetween, a tape contact surface portion which is disposed adjacent to said tape positioning means and is engaged by a part of said surface of the tape to guide the tape along a predetermined tape transport path and to

hold the tape in a flat profile, said tape contact surface portion being substantially shorter along said transverse direction than that of the tape non-contact surface portion, both the tape contact surface portion and the tape non-contact surface portion being perpendicular to the abutment surface of the stepped portion, said tape guide means further comprising an inclined surface portion which joins the tape contact surface portion and the tape non-contact portion to each other, said inclined surface being inclined relative to said tape contact surface.

4,688,127

MAGNETIC RECORDING DISK CARTRIDGE WITH LOCKING MEMBER

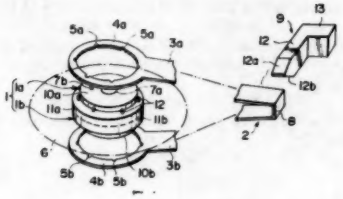
Kengo Oishi, and Tuyoshi Ono, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jul. 11, 1983, Ser. No. 512,753

Claims priority, application Japan, Jul. 16, 1982, 57-107699[U]

Int. Cl.⁴ G11B *23/033*

U.S. Cl. 360—132 **6 Claims**



1. A magnetic recording disk cartridge comprising a flexible recording disk having a cylindrical hub secured to the central portion thereof, and a casing in which the recording disk is accommodated characterized by having a locking member comprising a pair of resilient arm means which are fixed to the casing and are urged toward each other by the resilient force of the pair of arm means to grip therebetween said hub to fix the recording disk with respect to the casing so that the surfaces of the recording disk are not brought into contact with the inner surface of the casing, and a releasing member movable between an inoperative position in which it is operatively removed from the pair of resilient arm means and an operative position in which it urges the pair of resilient arm means away from the hub to release the recording disk from the locking member.

4,688,128

MAGNETIC TAPE CASSETTE HAVING TWO LAYERED PORTIONS

Haruo Shiba, Komoro; Takateru Sato, Saku; Kimio Tanaka, Saku, and Yoshiya Sakata, Saku, all of Japan, assignors to TDK Corporation, Tokyo, Japan

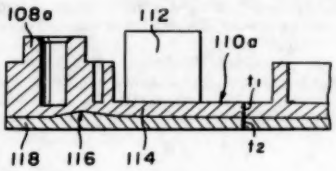
Filed Feb. 4, 1986, Ser. No. 825,997

Claims priority, application Japan, Feb. 15, 1985, 60-020826[U]

Int. Cl.⁴ G11B *23/087*

U.S. Cl. 360—132 **10 Claims**

1. A magnetic tape cassette comprising upper and lower half casings wherein at least screw-fastening portions and their neighboring portions at four corners of said upper and lower half casings are formed by a two-layered structure consisting of a first layer whose visual characteristic is one of the group consisting of opaque, transparent and semitransparent, and a second layer whose visual characterictic is one of the group



consisting of transparent and semitransparent, said second layer being laminated on said first layer in one piece.

4,688,129

PROTECTIVE JACKET FOR A DISK-SHAPED RECORDING MEDIUM

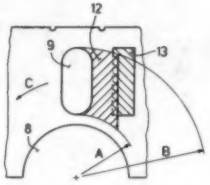
Dietrich Gruehn, Appenweier; Hubert Fehrenbach, Kehl, and Norbert Holl, Battenberg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed May 30, 1986, Ser. No. 868,702

Claims priority, application Fed. Rep. of Germany, Jun. 7, 1985, 8516550[U]

Int. Cl.⁴ G11B *23/03*

U.S. Cl. 360—133 **13 Claims**



1. A protective jacket for a disk-shaped recording medium, in particular a flexible data recording medium, comprising a flexible blank of plastic material which is folded and joined together at least three edges, to produce a jacket which is open along at most one edge, the jacket possessing two planar jacket walls and at least one read/write opening, said flexible data recording medium being rotated within the jacket for read/write operations in a predetermined direction, wherein certain parts of the jacket have different degrees of flexibility and at least one portion of a jacket wall adjacent the read/write opening when viewed in said predetermined direction of rotation of the medium of the read/write opening is provided with a region which has a greater rigidity than the plastic material of the other parts of the jacket, the said region cleaning the read/write area of the recording medium over a large area during rotation of the recording medium in the protective jacket.

4,688,130

PERPENDICULAR MAGNETIC RECORDING MEDIUM AND PRODUCTION PROCESS THEREOF

Yukio Nakanouchi, Ageo; Shigehiro Ohnuma, Sendai, and Tsuyoshi Masumoto, Sendai, all of Japan, assignors to Research Development Corporation of Japan, Tokyo, Japan, a part interest

Filed Aug. 19, 1985, Ser. No. 767,206

Claims priority, application Japan, Aug. 20, 1984, 59-171505

Int. Cl.[4] G11B *5/78*

U.S. Cl. 360—135 **7 Claims**

1. A perpendicular magnetic recording medium comprising:

a substrate having 5×10^5–5×10^9 fine projections per mm^2 formed on and projecting from the surface thereof, said projections having heights in the range of 0.01–10 μm and diameters in the range of 0.01–10 μm; and

fine particles of a ferromagnetic material deposited onto each of the projections uniformly in a columnar structure, said columnar structure extending perpendicularly to said surface and being substantially isolated from each other with their axes of easy magnetization also extending perpendicularly to said surface.

4,688,131

INFORMATION PROCESSING APPARATUS HAVING LOCKING MEANS PERMITTING READY DETACHMENT OF THE MAGNETIC DISK DRIVE ASSEMBLY

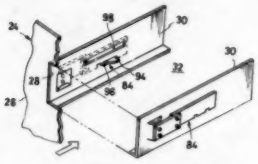
Yasushi Noda; Toshihiro Kitahara, and Hiroshi Tsuyuguchi, all of Tokyo, Japan, assignors to Teac Corporation, Tokyo, Japan

Filed Nov. 2, 1984, Ser. No. 667,554

Claims priority, application Japan, Nov. 14, 1983, 58-175884[U]

Int. Cl.[4] G11B *17/02, 31/00*; H05K *7/16*

U.S. Cl. 360—137 **5 Claims**



1. In an information processing apparatus employing a magnetic disk cartridge as an information storage medium, in combination:

(a) a disk drive assembly for the transfer of information with the magnetic disk cartridge, the disk drive assembly including an enclosure having defined therein an entrance slot through which the disk cartridge is to be inserted into the enclosure for information transfer;

(b) a housing having a mounting aperture defined therein;

(c) wall means within the housing for defining therein a disk drive compartment open to the mounting aperture in the housing, the disk drive assembly being adapted to be mounted in the disk drive compartment through the mounting aperture in the housing, the entrance slot in the enclosure of the thus mounted disk drive assembly being exposed through the mounting aperture in the housing; and

(d) locking means acting between the disk drive assembly and the wall means for automatically locking the disk drive assembly into the disk drive compartment against detachment from the housing as the disk drive assembly is mounted in the disk drive compartment through the mounting aperture in the housing, the locking means including a locking member on the wall means biased into engagement with the enclosure of the disk drive assembly in the disk drive compartment, said locking means being adapted to receive a force opposing the biased engagement of the locking member and the disk drive assembly to disengage the locking member from the disk drive assembly, said force being applied through the entrance slot of the disk drive assembly, thereby disengaging the disk drive assembly from the wall means for the ready withdrawal of the disk drive assembly from the disk drive compartment as required for maintenance or other purposes.

4,688,132

SUPERCONDUCTING MAGNET SYSTEM FOR OPERATION AT 13K

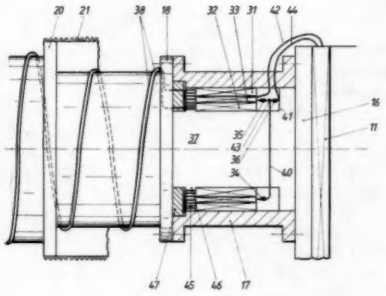
Cord-Henrich Dustmann, Weinheim, Fed. Rep. of Germany, assignor to BBC Aktiengesellschaft Brown, Boveri & Cie, Baden, Switzerland

Filed Feb. 15, 1985, Ser. No. 701,941

Claims priority, application Fed. Rep. of Germany, Feb. 15, 1984, 3405310

Int. Cl.[4] H02H *7/10*

U.S. Cl. 361—19 **18 Claims**



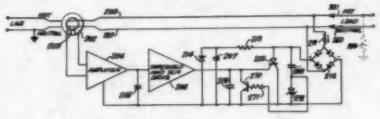
1. Superconducting magnet system, comprising a cryostat having a cold shield, a superconducting magnet coil disposed in said cold shield, a two-stage cryogenerator connected to said magnet coil for cooling said magnet coil to an operating temperature substantially between 10 and 13 K., and a flux pump connected to said magnet coil for feeding current to said magnet coil, said flux pump including a transformer having primary and secondary windings and superconducting switches having conductors, said magnet coil, windings and conductors being formed of superconducting material having a high critical temperature, said secondary winding and at least one of said superconducting switches of said flux pump being formed of a continuous superconducting wire, at least one of said superconducting switches being part of said superconducting material of said magnet coil, said superconducting material having stabilizing copper disposed thereon being removed at said at least one switch, and a switch heater replacing said stabilizing copper at said at least one switch.

4,688,133

ELECTRONIC DETECTION CIRCUIT FOR A GROUND FAULT CIRCUIT INTERRUPTER

LeRoy M. Freeman, Westbury, N.Y., assignor to Slater Electric Inc., Glen Cove, N.Y.

Filed Jan. 10, 1985, Ser. No. 690,161
Int. Cl.[4] H02H 3/16
U.S. Cl. 361—45 7 Claims



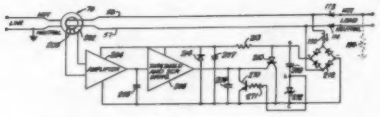
1. In a ground fault circuit interrupter of the type having a solenoid with a moveable core that is actuated by the current from a bridge rectifier when a silicon controlled rectifier responds to an imbalance in the power lines to cause a pair of latching contacts to open, the improvement comprising means for inhibiting the operation of the silicon controlled rectifier near the end of a cycle associated with the bridge rectifier, such that the solenoid is not actuated if the electric power associated with the cycle is insufficient to cause the contacts to latch in an open position.

4,688,134

GROUND FAULT CIRCUIT INTERRUPTER AND ELECTRONIC DETECTION CIRCUIT

LeRoy M. Freeman, Westbury; Paul D. Gernhardt, Northport, and Ferdinand E. Orbeta, Kew Gardens, all of N.Y., assignors to Slater Electric Inc., Glen Cove, N.Y.

Filed Jan. 10, 1985, Ser. No. 690,160
Int. Cl.[4] H02H 3/26
U.S. Cl. 361—45 25 Claims



1. A ground fault circuit interrupter in a power distribution system comprising:

an electromagnetic coil means having a moveable core;

at least two pivot arms that rotate in response to the linear movement of the moveable core of said electromagnetic coil means;

at least two pairs of contacts, one contact of each pair being stationary and the other contact of each pair being disposed on a deflectable flexure arm, each of said deflectable flexure arms being responsive to the rotation of one of said pivot arms, said deflectable flexure arms normally biasing said contacts in a closed position;

means detecting the occurence of a fault in said power distribution system in order to actuate said electromagnetic coil means, such that said pivot arms rotate, thereby causing said deflectable flexure arms to separate said contacts and interrupt the flow of current, said detecting means having a bridge rectifier that provides a current to said electromagnetic coil means when a silicon controlled rectifier responds to an imbalance in the power lines; and

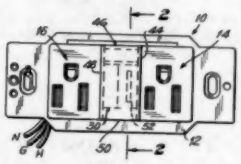
means inhibiting the operation of the silicon controlled rectifier near the end of a cycle associated with the bridge rectifier, such that the electromagnetic coil means is not actuated if the electric power associated with the cycle is insufficient to cause the contacts to latch in an open position.

4,688,135

DUPLEX ELECTRICAL RECEPTACLE WITH REPLACEABLE SURGE SUPPRESSOR

Howard S. Leopold, Plainview, N.Y., assignor to Eagle Electric Mfg. Co., Inc., Long Island City, N.Y.

Filed Aug. 8, 1986, Ser. No. 894,955
Int. Cl.[4] H02H 1/04
U.S. Cl. 361—118 12 Claims



1. A replaceable surge-suppressor arrangement, comprising:

(a) an electrical receptacle having an electrical outlet connected to line voltage and having electrical sockets for receiving an electrical device to be protected from transient line voltage surges, said receptacle having electrically-insulating walls bounding a cavity;

(b) a replaceable module of electrically-insulating material, and movable between a plugged-in state in which the module is inserted into the cavity, and a removed state in which the module is removed from the cavity;

(c) surge-suppressing means mounted on-board the module for joint movement therewith, and operative in the plugged-in state, for protecting the device from transient line voltage surges;

(d) malfunction-sensor means operative in the plugged-in state, for detecting a malfunction of the surge-suppressing means; and

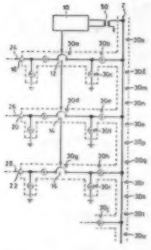
(e) failure-indicator means operative in the plugged-in state in response to detection of the malfunction, for alerting a user to the existence of the malfunction and the need to remove the module from the cavity for replacement of the surge-suppressing means.

4,688,136

GAS INSULATED SWITCHGEAR

Takao Yamauchi, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Apr. 3, 1986, Ser. No. 847,462
Claims priority, application Japan, Apr. 4, 1985, 60-73114
Int. Cl.[4] H02H 1/00
U.S. Cl. 361—120 4 Claims



1. In a gas insulated switchgear having a housing providing a gas chamber having a gaseous medium insulating a bus bar circuit disposed inside the gas chamber and connected to supply current to a transmission line circuit outside the gas chamber, a circuit interrupter connected in the bus bar circuit dis-

posed inside the gas chamber for interrupting current flowing therethrough, and a protective device controlling the operation of said circuit interrupter upon the occurrence of a fault in the circuit inside or outside the gas chamber, said protective device comprising:

means disposed inside the gas chamber for detecting an arc generated inside the gas chamber due to a fault in the bus bar circuit,

means disposed outside the gas chamber and connected to the bus bar circuit for detecting a fault in the circuits inside or outside the gas chamber, and

control means controlling the operation of said circuit interrupter to interrupt the flow of current through the bus bar circuit responsive only to concurrent arc and fault detection by said means.

4,688,137

SUPERCONDUCTING COIL DEVICE

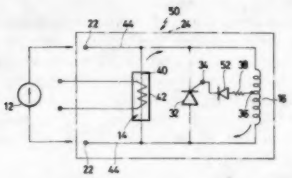
Masami Urata, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 31, 1985, Ser. No. 793,429

Claims priority, application Japan, Nov. 9, 1984, 59-236269

Int. Cl.[4] H01F *7/22, 5/08*

U.S. Cl. 361—141 **5 Claims**



1. A superconducting coil device, comprising:

(a) accommodating means for accommodating a cryogenic refrigerant;

(b) a superconducting coil having two ends and being immersed in the cryogenic refrigerant;

(c) a persistent current switch having two ends connected, respectively, to said ends of said superconducting coil so as to short-circuit said superconducting coil;

(d) a power supply provided outside of said accommodating means for connection selectively to the ends of said superconducting coil for charging and discharging said superconducting coil;

(e) a thyristor which is immersed in said cryogenic refrigerant and having an anode and a cathode, respectively, to the ends of said persistent current switch and the ends of said superconducting coil,

(f) said thyristor having a gate which makes electrical contact with an intermediate tap of said superconducting coil; and

(g) a diode which is immersed in said cryogenic refrigerant and connected in the forward direction between the gate of said thyristor and the intermediate tap of said superconducting coil.

4,688,138

ELECTROMAGNET DRIVE DEVICE

Osamu Nagata; Takashi Kajima, both of Kobe, and Toshiharu Ozaki, Osaka, all of Japan, assignors to Technological Research Association of Highly Reliable Marine Propulsion Plant, Tokyo, Japan

Filed Dec. 12, 1985, Ser. No. 808,107

Claims priority, application Japan, Dec. 12, 1984, 59-262232

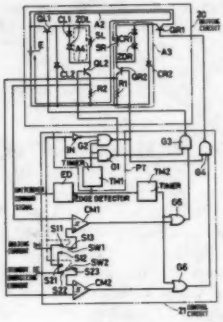
Int. Cl.[4] H01H *47/32*

U.S. Cl. 361—154 **12 Claims**

1. A method of driving a movable body using magnetic fields, comprising the steps of:

supplying a holding current to a first coil which is holding said movable body;

supplying an energizing current, of a level higher than said holding current to a second coil; and



decreasing said holding current rapidly so that said body is rapidly switched to being held by said second coil.

4,688,139

ELECTROMAGNET DRIVE DEVICE

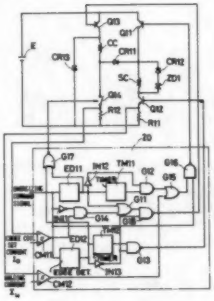
Osamu Nagata; Takashi Kajima, both of Kobe, and Toshihara Ozaki, Osaka, all of Japan, assignors to Technological Research Association of Highly Reliable Marine Propulsion Plant, Tokyo, Japan

Filed Dec. 12, 1985, Ser. No. 808,108

Claims priority, application Japan, Dec. 12, 1984, 59-262233

Int. Cl.[4] F02B *3/00;* **F02M** *7/00;* **H01H** *47/32*

U.S. Cl. 361—154 **5 Claims**



1. A device for driving an electromagnet from a direct current source, comprising:

first means in parallel coupled to said DC current source, including a first switch, a solenoid coil and a second switch, all connected in series;

second means, coupled in parallel to said first means, including a third switch, storage coil means for storing electromagnetic energy, and a fourth switch all connected in series;

third means, coupled between said first and second means including a diode connecting a junction between said storage coil means and said fourth switch to a junction between said first switch and said solenoid coil; and

controlling means for: (1) operating said first and second means, during a standby time of the solenoid coil, to store electromagnetic energy in said storage coil means, (2) operating said first and second means at a time of energiz-

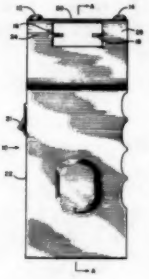
ing said solenoid coil so that said stored electromagnetic energy in said storage coil means is rapidly discharged into said solenoid coil, (3) operating said first switch in a chopper mode in which said first switch is alternately turned on and off, to maintain the solenoid in its energized state, and (4) connecting said switches, at a time of discharging said solenoid coil, so that electromagnetic energy in said solenoid coil is discharged into said storage coil means.

4,688,140

ELECTRONIC DEFENSIVE WEAPON

John Hammes, 5517 Morendo Dr., Las Vegas, Nev. 89107

Filed Oct. 28, 1985, Ser. No. 792,137
Int. Cl.[4] F41B *15/04*
U.S. Cl. 361—232 **18 Claims**



1. An electronic stun gun device comprising a case having first and second contact probes exposed on opposite ends of the top of said case, said contact probes separated by a first distance,

a cavity extending through the top of said case and extending across a portion thereof between said pair of contact probes,

first and second test gap probes extending into said cavity from opposite sides thereof and separated by a second distance, said second distance being smaller than said first distance, and

a closure member secured on said case at the top thereof for preventing an object from entering said cavity by passing through a plane extending between said contact probes.

4,688,141

DEVICE FOR ELECTROSTATICALLY SUSPENDING A BODY OR SAMPLE

Alain M. Bernard, Fresnes; Jean-Paul L. Canny, Villemonble, and Pierre L. Touboul, Bois d'Arcy, all of France, assignors to Office National d'Etudes et de Recherches Aerospatiales (ONERA), Chatillon, France

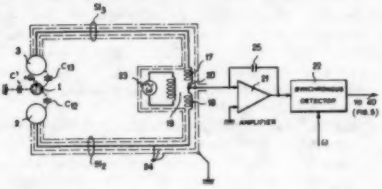
Filed Jun. 25, 1985, Ser. No. 748,721
Claims priority, application France, Jun. 25, 1985, 84 10018
Int. Cl.[4] G01P *15/125, 15/13*
U.S. Cl. 361—233 **5 Claims**

1. A device for electrostatically suspending a sample of material comprising

a sample carrying an electrostatic charge;

at least two conductive spherical electrodes respectively fed by high voltages of opposite polarity;

a conductive screen surrounding said sample and electrodes and brought to ground potential whereby the sample is submitted to a first force proportional to the square of the sample charge, a second force proportional to the product of the electrode voltages, a third force proportional to the



product of the sample charge by the electrode voltage; and

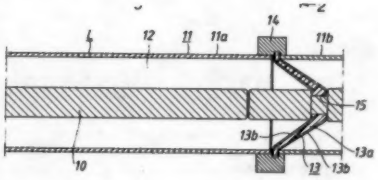
means for varying a voltage feed to the electrodes.

4,688,142

CURRENT TRANSMISSION SYSTEM FOR HVDC INCLUDING A SOLID INSULATOR HAVING A SURFACE COATING OF RESIN CONTAINING CHROMIUM OXIDE OR IRON OXIDE

Arne Hjortsberg; Göran Holmström, both of Västerås, and Erik Österlund, Enskede, all of Sweden, assignors to ASEA Aktiebolag, Västeraås, Sweden

Filed Oct. 14, 1986, Ser. No. 918,495
Claims priority, application Sweden, Oct. 16, 1985, 8504809
Int. Cl.[4] H02M *7/00*; H02B *1/20*; H02G *5/06*; H01B *17/42*
U.S. Cl. 361—332 **14 Claims**



1. An HVDC current transmission system, comprising a conductor, stressed by d.c. voltage, which is electrically insulated from a surrounding grounded casing by a gas in the form of pressurized sulfur hexafluoride (SF_6) and along part of its length by at least one solid insulator in contact with the gas and extending between the conductor and the casing, and wherein the solid insulator comprises a core of solid electrical insulating material with a coating provided thereon, the coating consisting of a resinous binder containing a powdered filler consisting esentially of particles of at least one of chromium oxide and iron oxide.

4,688,143

FUSE WELL AND HOUSING FOR PAD-MOUNTED, DOUBLE FUSED SWITCHGEAR

Lloyd R. Beard, Centralia, Mo., assignor to A. B. Chance Company, Centralia, Mo.

Filed Aug. 26, 1986, Ser. No. 900,539
Int. Cl.[4] H02B *5/00*; H02H *7/04*
U.S. Cl. 361—335 **3 Claims**

1. Padmounted, deadfront, fuse-protected switchgear apparatus, comprising:

a tank adapted to hold a liquid dielectric material and including a pair of upright, spaced apart end walls and a continuous, metallic side and bottom wall-defining member extending between and being coupled with said end walls,

said member presenting a downwardly and outwardly extending, obliquely oriented, apertured fuse assembly panel

adjacent the top margin thereof, a downwardly and inwardly extending, obliquely oriented first sidewall panel, a bottom panel, and an upright second sidewall panel;

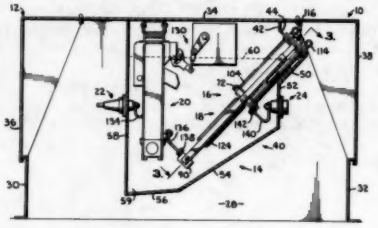
a plurality of elongated, laterally spaced apart fuse well assemblies within the confines of said tank and respectively in alignment with a fuse well panel aperture, each of said fuse well assemblies including

a plurality of elongated, laterally spaced apart, electrically insulative supports;

means fixedly securing said supports to said member with the longitudinal axes of the supports being substantially parallel with the axis of the associated aperture and generally aligned with said first sidewall panel;

an intermediate contact body presenting a fuse assembly-clearing opening therethrough and carrying an electrical contact, said intermediate contact body being coupled to said supports intermediate the ends thereof;

a lower contact body presenting a fuse tube-receiving opening therethrough and carrying electrical contact, said lower contact body being attached to said supports adjacent the lower ends thereof and in spaced relationship to said intermediate contact body; and



a thin, tubular, electrically insulative element secured and extending between said intermediate contact body and the underside of said fuse assembly panel in surrounding relationship to said associated aperture,

said assembly being configured and arranged for receiving a fuse assembly between said intermediate and lower contact bodies with the fuse assembly having a lower, open-ended fuse-receiving tube oriented to fit within the opening defined by said lower contact body,

said lower contact body being spaced from the lower margin of the first sidewall panel and said bottom panel for providing sufficient dielectric material beneath the fuse assembly to permit safe operation of the fuse assembly without short-circuiting;

an electrical vacuum switch for each fuse well assembly;

means mounting each of said switches within said tank;

means electrically coupling each of the switches in series with a respective associated fuse well assembly to present a number of switch-fuse well assembly combinations; and

separate source and load bushing devices for each of said switch-fuse well assembly combinations, respectively extending through said member and being electrically connected in series with the asssociated combination.

4,688,144

SHUTTER ASSEMBLY FOR A MOTOR CONTROLLER

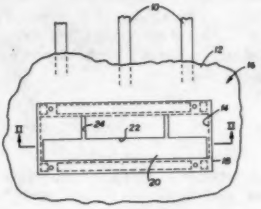
John D. Kleinecke; Samir F. Farag, and Thomas R. Little, all of Wichita Falls, Tex., assignors to Siemens-Allis, Inc., Atlanta, Ga.

Filed Jan. 23, 1986, Ser. No. 821,703
Int. Cl.[4] H02B *1/14*
U.S. Cl. 361—345 **15 Claims**

1. A shutter assembly in a motor control center having a stab opening, comprising:

a generally flat stationary member defining a central opening and a vertical slit which opens into the central opening;

means fastening said stationary member to the motor control center with the central opening overlaying the stab opening and said stationary member being spaced from the motor control center; and



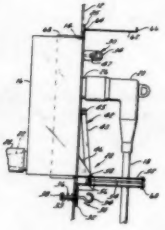
a movable member having a guide thereon and being positioned between the motor control center and the stationary member with the guide extending through the slit and vertically movable therein.

4,688,145

REMOVABLE FUSE ASSEMBLY FOR PAD MOUNTED UNDERGROUND DISTRIBUTION SWITCHGEAR

Harvey W. Mikulecky, Oconomowoc, Wis., assignor to RTE Corporation, Brookfield, Wis.

Filed Apr. 25, 1985, Ser. No. 727,286
Int. Cl.[4] H02B *1/10*; H05K *7/16*
U.S. Cl. 361—349 **8 Claims**



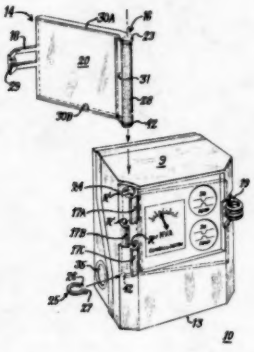
1. A mounting assembly removably supporting an over current fuse package in an opening in a switchgear enclosure, said fuse package inclusing a housing having an entry bushing on one side which is adapted to be connected to a cable connector and an internal bushing on the other side which is adapted to be connected to a receptacle in the enclosure, the assembly comprising a panel supporting the fuse package in the opening in the enclosure, first means mounted on the enclosure securing the panel against the enclosure, second means selectively locking the panel to the enclosure, said second means including a pair of slide support members mounted on the enclosure, a bracket member mounted on the panel, a rod means rotatably mounted in said brackets and including a key on each end operatively positioned in said slide support members and means moving said rod between a locked position and an unlocked position with respect said support members.

4,688,146

MOLDED PLASTIC ENCLOSURE FOR ELECTRIC SERVICE APPARATUS

Larry J. Newmark, Avon, and David A. Hibbert, Tolland, both of Conn., assignors to General Electric Company, New York, N.Y.

Filed Jun. 16, 1986, Ser. No. 874,755
Int. Cl.[4] H02B *1/04, 9/00*
U.S. Cl. 361—364 **14 Claims**



1. A molded plastic enclosure with electrical apparatus comprising:

a plastic base attached to a molded plastic cover, said cover including a first arcuate rabbet integrally formed therein receiving a hinge pin integrally located on a molded plastic door and means on said base for receiving an electric switch or circuit breaker;

said molded plastic door comprising a planar central portion having a locking hasp integrally formed at one end and a hinge pin integrally formed at an opposite end, said hinge pin having first and second radial ends wherein said first radial end has a larger radius than said second radial end, said second radial end and said hinge pin passing through a transverse circular opening defined by said first rabbet and stopping said first radial end from passing through said circular opening; and

recess means formed within said cover oppositely adjacent said first radial end and receiving said first radial end within said recess means with said hinge pin within said opening to thereby prevent removal of said hinge pin and said door from said cover.

4,688,147

COOLING DEVICE ATTACHED TO EACH SURFACE OF ELECTRONIC PARTS ON A PRINTED-WIRING BOARD

Izumi Ono, Hachioji, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Sep. 19, 1986, Ser. No. 909,229
Claims priority, application Japan, Sep. 20, 1985, 60-208203
Int. Cl.[4] H02B *1/00*
U.S. Cl. 361—385 **13 Claims**

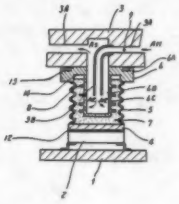
1. A cooling device located between a cooling plate and an electronic part to be cooled, mounted on a printed-wiring board, for transferring heat raised in the electronic part to the cooling plate using a first coolant which circulates in the cooling plate and said cooling device through a hole provided on a surface of the cooling plate, said cooling device comprising:

hollow means being thermally conductive, having a hollow chamber for allowing the first coolant circulating through said hollow chamber avoiding the first coolant flowing out from said hollow chamber;

connection means being thermally conductive, for connecting said hollow means to the surface of the cooling plate, opening the hole on the surface of the cooling plate to said hollow chamber;

thermal conduction means attached to a surface of the electronic part;

bellows means for connecting said thermal conduction means to said connection means providing a space between said hollow means and said bellows means and



between said hollow means and said thermal conduction means, and pressing said thermal conduction means to the surface of the electronic part and

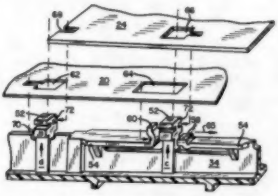
a second coolant being liquid at ordinary temperatures and chemically inactive to said bellows and filling into said space, for transferring heat from said thermal conduction means to said hollow means by a convection current of said second coolant.

4,688,148

PACKAGING FOR ELECTRICAL INSTRUMENTS

Robert L. Mallory, Portland; Alfred H. Schamel, West Linn, both of Oreg., and Stephen M. Sekel, Vancouver, Wash., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Jun. 6, 1986, Ser. No. 872,297
Int. Cl.[4] H05K *1/00, 5/02*
U.S. Cl. 361—395 **3 Claims**



1. Packaging for electrical instruments required to be substantially enveloped in metal sheeting with a plastic overcovering, said packaging comprising;

a plastic base, fastening towers of plastic material and configured with first and second fastening means molded into the plastic base, a card cage of metal sheeting having a wall provided with slots configured to interlock with the first fastening means of the towers, said fastening towers projected through the slots of the card cage and in interlocking engagement therewith, a circuit board provided with slots configured to interlock with the second fastening means and fastening the circuit board to a portion of the fastening towers projected through the slots, said first and second fastening means spaced on the tower to space the circuit board from the wall of the card cage, and a plastic overcover fastened to the base over the card cage to envelope the card cage.

4,688,149
ELECTRICAL JUNCTION BOX

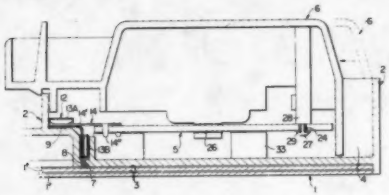
Nori Inoue, Yokkaichi; Yasuharu Moriai, Suzuka; Atushi Sakatani, Matsuzaka, and Noriyuki Yoshida, Suzuka, all of Japan, assignors to Tokai Electric Wire Company, Ltd., Yokkaichi and Sumitomo Electric Industries, Ltd., Osaka, both of, Japan

Continuation of Ser. No. 483,557, Apr. 11, 1983, abandoned. This application Sep. 26, 1986, Ser. No. 912,688

Claims priority, application Japan, Apr. 15, 1982, 57-63007; Feb. 14, 1983, 58-22624; Feb. 14, 1983, 58-22625; Feb. 14, 1983, 58-22627

Int. Cl.[4] H05K *1/18*

U.S. Cl. 361—399 **1 Claim**



1. An electrical junction system comprising a wiring board carrying a plurality of bus bar conductors each having an end extending upwardly therefrom, a case member covering the upper side of said wiring board and having holes into respective ones of which the ends of said bus bar conductors project with said case member covering said wiring board, said case member also having terminal receiving seats adjacent to the respective upright holes and extending substantially horizontally, a printed circuit board carrying functional parts and having one side edge from which a plurality of tab-like contactors project in side-by-side relationship, each of said tab-like contactors having at a longitudinally intermediate portion thereof an engaging tab extending upright therefrom, a cover member affixed to the circuit board and covering and protecting said functional parts, said cover member having a load bearing hole receiving said engaging tabs of said tab-like contactors and bearing the adjacent portion of said tab-like contactors upon the occurrence of horizontal relative displacement between said cover member and said tab-like contactors, intermediate terminals each having a substrate bent into L-shape and receptacle-like contactors provided at both ends of said substrate, one of said receptacle-like contactors of each of said intermediate terminals being fitted into a corresponding hole in said case member to contact with the end of the bus bar conductor projecting thereinto, the other receptacle-like contactor being supported on the corresponding terminal receiving seat of said case member, said tab-like contactors of said circuit board being inserted into said other receptacle-like contactors to establish contact therebetween upon sliding of said circuit board horizontally.

4,688,150
HIGH PIN COUNT CHIP CARRIER PACKAGE

Robert K. Peterson, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation-in-part of Ser. No. 620,998, Jun. 15, 1984, abandoned. This application Apr. 7, 1986, Ser. No. 849,351

Int. Cl.[4] H05K *1/18*

U.S. Cl. 361—403 **5 Claims**

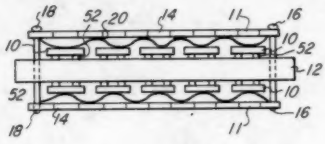
1. A chip carrier package assembly comprising: a printed circuit board having oppositely disposed faces with electrical circuits printed on both faces;

at least a first and second chip carrier with each single chip carrier having at least one semiconductor chip with bonding points mounted thereon and each single chip carrier having a plurality of electrical contacts and conductors connecting preselected bonding points to preselected electrical contacts;

at least two oppositely disposed rails with each single rail having a pressure bias spring mounted on a first surface;

a plurality of conductive pads with each single electrical contact having a conductive pad mounted thereon; and

mechanical connectors connecting the one rail to other rail sandwiching an assembly between one rail and other rail with the assembly including the printed circuit board with the first chip carrier being electrically connected to the



one surface with electrical contact being made between the electrical circuits thereon and the electrical contacts of the first chip carrier via the conductive pads and the second chip carrier being electrically connected to the other surface with electrical contact being made between the electrical circuits thereon and the electrical contacts of the second chip carrier via the conductive pads and pressure bias being provided by one rail's pressure bias spring applying pressure to the first chip carrier and the other rail's pressure bias spring applying pressure to the second chip carrier.

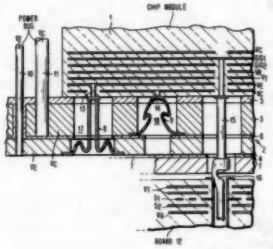
4,688,151
MULTILAYERED INTERPOSER BOARD FOR POWERING HIGH CURRENT CHIP MODULES

Charles J. Kraus, Poughkeepsie; Herbert I. Stoller, Wappingers Falls, and Leon L. Wu, Hopewell Junction, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 10, 1986, Ser. No. 838,065

Int. Cl.[4] H05K *5/00*

U.S. Cl. 361—405 **6 Claims**



1. An interposer board positioned between a multilayered module and a module mounting board,

said module having a plurality of chip powering levels and signal path levels for servicing a plurality of semiconductor circuit chips,

said interposer board comprising a plurality of insulated current-carrying conductive planes of greater conductivity than said powering levels of said module,

groups of flexible contacting members,

each said plane being apertured and receiving one of said groups of flexible contacting members, each member of the same group, at one end, being ohmically connected to a respective first location on a respective plane and, at the other end, to a respective second location on an associated powering level,

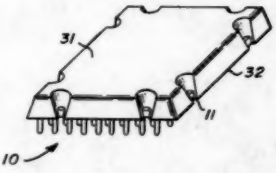
said first locations being at a multiplicity of points throughout the surface area of the respective plane.

4,688,152

MOLDED PIN GRID ARRAY PACKAGE GPT

Chok J. Chia, Santa Clara, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Aug. 11, 1986, Ser. No. 895,395
Int. Cl.[4] H05K 7/06
U.S. Cl. 361—408 **3 Claims**



1. A molded pin grid array package comprising:

a printed circuit wiring board having plated through holes including a plurality of package pins secured therein and extending from a first face to form a pin grid array;

said printed wiring board having a second face which carries a printed wiring pattern and a centrally mounted semiconductor die, said printed wiring including an array of traces having tips that form a pattern that surrounds the periphery of said die;

means electrically connecting said pattern that surrounds said die to the bonding pads on said die; and

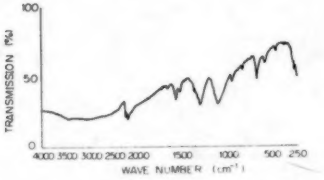
a molded plastic encapsulant surrounding said second face of said printed wiring board, said molded plastic encapsulant including a series of indentations around its peripheral edge, whereby said printed wiring board along with said semiconductor die and said electrical connecting means are encapsulated in a molded package.

4,688,153

CHARGE TRANSFER COMPLEX

Makoto Ebisawa; Shuko Shindo; Kenichi Hashizume, and Isao Isa, all of Shibukawa, Japan, assignors to The Japan Carlit Co., Ltd., Tokyo, Japan

Filed Nov. 12, 1986, Ser. No. 930,317
Claims priority, application Japan, Nov. 18, 1985, 60-256617
Int. Cl.[4] H01G 9/05
U.S. Cl. 361—433 **8 Claims**



7. A solid electrolytic capacitor comprising:

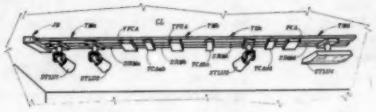
a charge transfer complex as an electrolyte which has an isoquinoline substituted by an amyl radical at its N-position as a donor and 7,7,8,8-tetracyanoquinodimethane as an acceptor.

4,688,154

TRACK LIGHTING SYSTEM WITH PLUG-IN ADAPTERS

Ole K. Nilssen, Caesar Dr., Barrington, Ill. 60010

Continuation-in-part of Ser. No. 543,302, Oct. 19, 1983, abandoned. This application Oct. 15, 1984, Ser. No. 660,795
Int. Cl.[4] F21V 21/34
U.S. Cl. 362—147 **29 Claims**



1. A track lighting system comprising:

at least one track section adapted for mounting onto a surface, said track section comprising two pairs of track conductors and a receptacle slot adapted to receive and hold a number of track plug-in units, one of said pairs of track conductors being connected with a source of electric power; and

at least one track plug-in unit having electrical terminal means operable to make contact with said pairs of track conductors and operable to effect flow of electric energy therebetween.

4. A track lighting system comprising:

at least one track section adapted for mounting onto a surface, the track section having: (i) at least one pair of track conductors connected with an AC voltage of frequency substantially higher than that of the voltage normally present on an ordinary electric utility power line, and (ii) a receptacle slot adapted to receive and hold a number of track lighting units; and

at least one track lighting unit operable: (i) to be received and held by the receptacle slot, (ii) when so held, to make contact with the track conductors, and (iii) to be powered by the AC voltage present thereon;

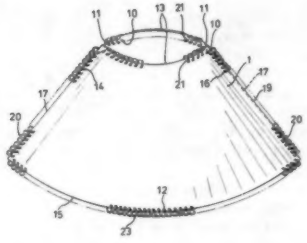
thereby permitting the use of track lighting units adapted to be properly powered only from an AC voltage of frequency substantially higher than that of the voltage normally present on an ordinary electric utility power line.

4,688,155

ASSEMBLED LAMPSHADE

Mycoh Huang, Fl. 4,84, Min Chih Street, Yungho, Taipei Hsien, Taiwan

Filed Dec. 11, 1986, Ser. No. 940,338
Int. Cl.[4] F21V 1/06
U.S. Cl. 362—352 **2 Claims**



1. An assembled lampshade comprising:

two sector shades, each having four arrays of apertures near its top, bottom, first side and second side edges respectively;

two top spiral connectors connected to the top edges of said

sector shades, respectively, through said arrays of apertures provided near the top edges of said sector shades;

two bottom spiral connectors connected to the bottom edges of said sector shades, respectively, through said arrays of apertures provided near the bottom edges of said sector shades;

two side spiral connectors, one connecting the first side edge of one of said sector shades and the adjacent second side edge of the other sector shade together, and the other connecting the second side edge of said one sector shade and the adjacent first side edge of said other sector shade together through said corresponding arrays of apertures provided near the side edges of said sector shades;

two top supporting frames inserted through said top spiral connectors respectively and detachably engaged with each other at their ends to form a closed ring;

two bottom supporting frames inserted through said bottom spiral connectors respectively with their ends opposite to each other;

two ribs, each inserted through one of said side spiral connectors, and detachably engaged with one of said top supporting frames at its one end and with one pair of the opposite ends of said bottom supporting frames at its another end so that said bottom supporting frames are detachably engaged with each other through said ribs; and

a mounting member adapted to mount said sector shades to a lamp stand, and having two ends detachably engaged with said top spiral connectors respectively.

4,688,156

LIGHT-SHIELDING SCREEN DEVICE

Akira Suzuki, Nagoya; Yukio Mizuta, Nishi Kasugai; Rejiro Sato, Fuji, and Kunio Shimizu, Ootsuki, all of Japan, assignors to Kabushiki Kaisha Tokai, Aichi, Japan

Filed Apr. 25, 1985, Ser. No. 727,139

Claims priority, application Japan, Apr. 26, 1984, 59-63140[U]

Int. Cl.⁴ F21V *11/00*

U.S. Cl. 362—354 **18 Claims**

1. A light-shielding screen device comprising:

(a) a first light transmissible substrate;

(b) a second light transmissible substrate; and

(c) an intermediate layer located between said first light transmissible substrate and said second light transmissible substrate,

said intermediate layer comprising at least one light-shielding screen portion and a light non-transmissible retaining portion,

said at least one light-shielding screen portion being located in the middle area of said intermediate layer and said light non-transmissible retaining portion located at least in a portion of the remaining area of said intermediate layer, said portion of the remaining area including the entire outermost peripheral area of said intermediate layer,

said light-shielding screen comprising a plurality of non-transparent light shielding lines,

said light non-transmissible retaining portion of the intermediate layer securely retaining on both its sides said first light transmissible substrate and said second light transmissible substrate, respectively.

4,688,157

SWITCHING CIRCUIT USING A FAST DIODE AND PROVIDED WITH MEANS FOR DAMPING OSCILLATIONS ON OPENING

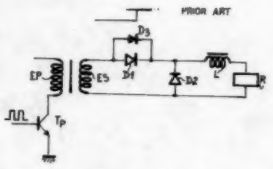
Klaus Rischmueller, Aix en Provence, France, assignor to Thomson-CSF, Paris, France

Filed Jan. 7, 1986, Ser. No. 816,716

Claims priority, application France, Jan. 15, 1985, 85 00522

Int. Cl.⁴ H02M *3/335*

U.S. Cl. 363—20 **3 Claims**



1. In a circuit which includes an inductive load in series with a relatively fast main rectifying diode and a source of alternating voltage designed to switch off and on to switch the diode between a conducting and a blocking state and which tends to oscillate when the diode is switched from the conducting to the blocking state because of parasitic inductances and capacitances in the circuit the improvement for damping the oscillation which comprises a supplementary diode similarly poled in parallel with the main diode and characterized by a recovery time which is substantially longer than that of the main diode and by a current handling capacity smaller than that of the main diode.

4,688,158

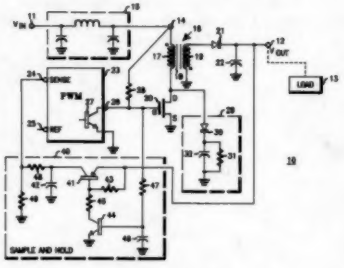
FLYBACK POWER SUPPLY

Gregory A. Peterson, Morris; Michael A. Loda, Hanover Park, and Timothy E. Graff, Palatine, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 799,677, Nov. 19, 1985, abandoned. This application Nov. 21, 1986, Ser. No. 933,661

Int. Cl.⁴ H02M *3/335*

U.S. Cl. 363—21 **12 Claims**



1. A flyback power supply comprising:

terminal means for receiving a DC power supply voltage input signal having a magnitude which may vary over a range of magnitudes;

transformer means having a primary winding coupled to said terminal means and a secondary winding;

drive circuit means having at least a sense signal input and

providing, as an output, a control input signal to a control electrode of a drive device coupled to said primary winding for controlling primary current therein provided by said power supply voltage input signal;

rectifier means coupled to said secondary winding for rectifying signals inducted in said secondary winding and providing, at an output terminal, a DC power supply output voltage in response thereto;

feedback path means connected between said output terminal and said sense input for controlling said drive circuit means to maintain said power supply output signal at a desired level;

wherein the improvement comprises;

said feedback path means comprising a sample and hold circuit comprising a controllable gate device provided between said output terminal and a holding device connected to said sense input, a control terminal of said gate device receiving a switching signal, wherein said gate device is alternately opened and closed such that said power supply output signal is effectively sampled by said holding device when said control device causes primary winding current flow causing a flux increase in said transformer means so as to store energy therein, and wherein said holding device is effectively disconnected from said output terminal at all other times when flux in said transformer means decreases and said stored energy is provided to said secondary winding and to said rectifier means, whereby stability of said power supply is provided by discontinuous feedback path sampling at times other than the times at which energy is transferred from said primary to secondary windings.

4,688,159

SWITCHED-MODE POWER SUPPLY HAVING A STANDBY STATE

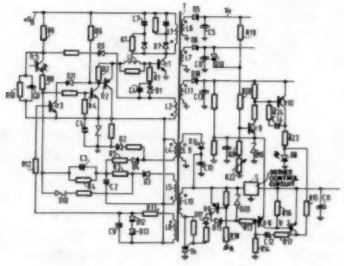
Antonius A. M. Marinus, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 30, 1986, Ser. No. 890,592

Claims priority, application Netherlands, Aug. 26, 1985, 8502338

Int. Cl.[4] H02M *3/335*

U.S. Cl. 363—21 **8 Claims**



1. A switched-mode power supply circuit having an operating state and a standby state comprising: a first controllable switch connected in series arrangement with a primary winding of a transformer, the series arrangement being coupled to the terminals of a d.c. input voltage, said transformer having a first secondary winding for providing a first d.c. output voltage in the operating state and a second secondary winding for providing a second d.c. output voltage, a second switch for bringing the supply circuit into the stand-by state in which the value of the first output voltage is considerably lower than in the operating state, and a third switch controllable by means of the second switch and coupled to the second secondary winding for maintaining the second output voltage in the stand-by state at substantially the same value as in the operating state, a comparison stage for comparing an output voltage with a reference voltage and for generating a control signal for controlling the duration of periodically occurring drive pulses applied to the first switch, characterized in that a duration-determining element is coupled to the second secondary winding and to the comparison stage for maintaining an oscillation mode in the stand-by state, whereby the first switch conducts a number of consecutive times and subsequently is non-conductive during a given period, under the influence of the control signal, the frequency of said oscillation being many times lower than the repetition frequency of the drive pulses applied to the first switch.

4,688,160

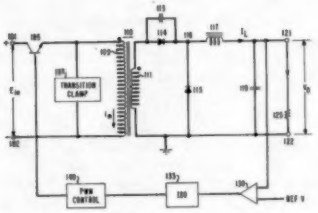
SINGLE ENDED FORWARD CONVERTER WITH RESONANT COMMUTATION OF MAGNETIZING CURRENT

Simon Fraidlin, Randolph, N.J., assignor to American Telephone and Telegraph Co., AT&T Bell Labs, Murray Hill, N.J.

Filed Dec. 19, 1985, Ser. No. 810,981

Int. Cl.[4] H02M *3/335*

U.S. Cl. 363—21 **5 Claims**



2. A forward converter comprising:

a transformer including a magnetizing inductance and having an input winding and an output winding;

input means for accepting a source of energy;

a power switch for periodically coupling energy from the input means to the input winding in a unidirectional flow;

output means for accepting a load to be energized;

a rectifying diode and a filter inductor connected in a series connection, and the series connection coupling the output winding to the output means, and a flyback diode connected to supply current to the filter inductor when the rectifying diode is nonconducting,

a capacitor shunting the rectifying diode and having a capacitor value that causes the capacitor and magnetizing inductance to be resonant at an operating frequency of the power switch, and a winding of the transformer, the flyback diode and the capacitor being part of a resonant closed circuit path;

whereby current due to stored magnetizing energy in the magnetizing inductance flows in a first direction in the resonant closed circuit path and is stored as electrical energy in the capacitor, and current flows in a second direction opposite to the first direction to discharge electrical energy stored in the capacitor.

4,688,161

REGULATED POWER SUPPLY APPARATUS AND METHOD USING REVERSE PHASE ANGLE CONTROL

John H. Covington, Carrollton, Tex., assignor to Vari-Lite, Inc., Dallas, Tex.

Filed Jul. 16, 1986, Ser. No. 887,367

Int. Cl.[4] H02M *5/458*

U.S. Cl. 363—37 **3 Claims**

1. A power converter for controlling alternating line power for transfer to a load, comprising.

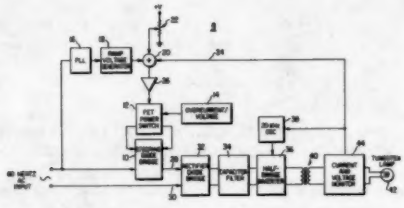
a phase lock loop circuit connected to receive said line

power and generate a sequence of pulses at zero crossovers of said line power,

a ramp voltage generator having each ramp segment initiated by one of said pulses,

means for generating an input signal for selecting the amplitude of power delivered to said load,

means for comparing said ramp signal to said input signal to



produce said control signal having an active state which is initiated at said zero crossovers and is terminated upon a comparison of said ramp signal to said input signal,

a power switch responsive to said control signal for conducting said line power therethrough during the active states of said control signal, and

means for transferring said line power conducted through said switch to said load.

4,688,162

RECTIFIER CONTROL APPARATUS WITH IMPROVED POWER FACTOR

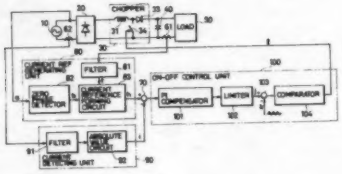
Nobuyoshi Mutoh, Hitachi; Keijiro Sakai, Hitachioota; Toshio Suzuki, Hitachi; Akiteru Ueda, Naka; Kenji Nandoh, Matsudo, and Ikuo Okajima, Yachiyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

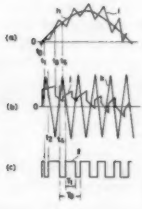
Filed Mar. 19, 1986, Ser. No. 841,425

Claims priority, application Japan, Mar. 29, 1985, 60-63658

Int. Cl.[4] H02M *7/06*

U.S. Cl. 363—80 **7 Claims**





1. A control apparatus for a rectifying circuit comprising:

a rectifying means for converting an AC voltage into a DC voltage;

a chopper means connected with rectifying means on its DC output side;

a smoothing capacitor for smoothing the output voltage of the chopper means to apply a smoothed DC voltage to a load; and

a current control means for producing a deviation signal between a predetermined current reference signal and an AC input current of the rectifying means and controlling the ON-OFF operation of the chopper means in accordance with the deviation signal,

characterized in that

said current control means includes means for generating as the current reference signal a signal which has a magnitude corresponding to a magnitude of the load and is synchronized with the AC voltage.

4,688,163

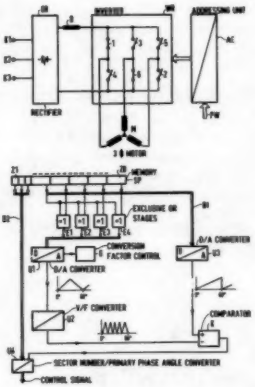
METHOD FOR CONTROLLING THE PHASE ANGLE OF THE OUTPUT CURRENT OR THE OUTPUT VOLTAGE OF A FREQUENCY CONVERTER AND APPARATUS FOR CARRYING OUT THE METHOD

Georg Heinle, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 1, 1986, Ser. No. 880,790

Int. Cl.[4] H02P *13/20*

U.S. Cl. 363—96 **8 Claims**



1. A method for controlling the phase angle of the output current of a frequency converter having an intermediate d-c current link, wherein an inverter section of the frequency converter comprises six electronic switches which are arranged in a three-phase bridge circuit and which can be addressed in pairs in six possible switching combinations, a primary phase angle corresponding to a natural multiple of 60° el being respectively associated with each switching combination, a reference value for the phase angle of the output current being fed to a drive unit for the inverter which detects the two primary phase angles immediately adjacent to the phase angle of the output current, and switches the switching combinations associated with an alternating clock pulse back and forth, alternatingly such that the phase angle of the output current agrees with the given reference value, said method comprising the step of controlling the period of an a-c clock frequency associated with the inverter section by the reference value for the phase angle such that the period of the output current located in the middle between two primary phase angles has a minimum value and the period of the output current corresponding with its phase angle to a primary phase angle has a maximum value.

4,688,164

DIRECT-VOLTAGE CONVERTER FOR FEEDING AN APPLIANCE WITH AN INDUCTIVE COMPONENT

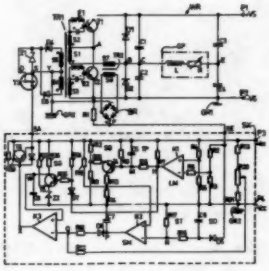
Gerard Rilly, Unterkirnach, Fed. Rep. of Germany, assignor to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, Fed. Rep. of Germany

Filed Mar. 5, 1986, Ser. No. 836,388

Claims priority, application Fed. Rep. of Germany, Mar. 8, 1985, 3508289

Int. Cl.[4] H02P *13/18;* **H02M** *7/5387*

U.S. Cl. 363—98 **19 Claims**



1. A direct-voltage converter for feeding an appliance with an inductive element, comprising: a source of direct voltage: a transformer having a first two windings connected to two transistors for making said two transistors alternately conductive in a push-pull mode; two free-running diodes connected in parallel with said two transistors; a third winding on said transformer, said two diodes being connected to each other at a junction between said free-running diodes which is connected to a junction between said two transistors through said third winding, said junction between said diodes supplying output voltage of said diodes; a fourth winding on said transformer, and electronic switching means connected in parallel with said fourth winding; pulse shaping means for making said electronic switching means periodically conductive with a switching pulse; said pulse shaping means having two direct current circuit points with voltages proportional to the peak value and periodicial relationship of currents flowing through said two transistors; an amplitude-comparison stage in said pulse shaping means with inputs connected to said two circuit points for comparing the voltages at said two circuit points, said amplitude-comparison stage having an output voltage controlling frequency of said switching pulse for protecting said converter against circuit failure.

4,688,165

CURRENT FED INVERTER BRIDGE WITH CONDUCTION OVERLAP AND LOAD TUNING

Duard L. Pruitt, Cinnaminson, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Apr. 11, 1986, Ser. No. 850,813

Int. Cl.[4] H02M *7/5387*

U.S. Cl. 363—132 **10 Claims**

1. A direct-current to alternating-current inverter, comprising:

a first series combination of first and second controllable switches having a first intermediate terminal therebetween, said first series combination of first and second controllable switches being adapted to be coupled to first and second terminals of a source of substantially constant direct current for, when closed, conducting at least a portion of said substantially constant direct current;

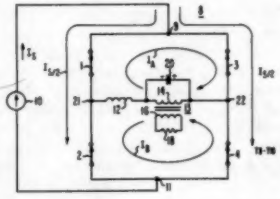
a second series combination of third and fourth controllable switches having a second intermediate terminal therebetween, said second series combination of third and fourth controllable switches being coupled in parallel with said first series combination of first and second controllable switches for, when closed, conducting at least a portion of said substantially constant direct current;

a load coupled to said first and second intermediate terminals for having applied thereacross alternating voltages which depend upon the combination of said first, second, third and fourth controllable switches which are conducting;

capacitance means coupled across said load to form a parallel capacitance-load circuit;

inductance means serially coupled with said capacitance-load circuit for conducting alternating capacitance-load current;

switch control means coupled to said first, second, third and fourth controllable switches for, in recurrent sequence of four intervals, (a) maintaining said first and fourth controllable switches conductive and said second and third controllable switches nonconductive during a first interval of said recurrent sequence, for directing said substantially constant direct current through said inductance means and said load in a first polarity, and for charging said capacitance means in a first polarity, (b) for rendering said second and third controllable switches conductive during a second interval of said recurrent sequence, whereby said first, second, third and fourth controllable switches are conductive, thereby reducing the voltage between said first and second intermediate terminals to zero, and creating paths including said first, second, third and fourth controllable switches by which said inductance means can ring with said capacitance means to form a first ringing



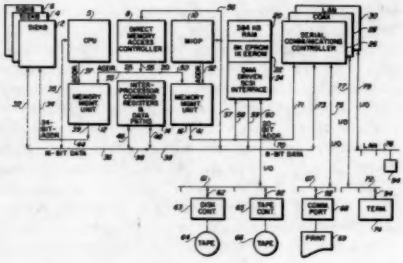
current such that the current flow in said first and fourth controllable switches is decreased by said ringing current, (c) for rendering said first and fourth controllable switches nonconductive at a time when the current therethrough is less than one-half said substantially constant direct current to initiate a third interval of said recurrent sequence, whereby only said second and third controllable switches are conductive during said third interval of said recurrent sequence, whereby a voltage appears across said first and second intermediate terminals which is poled to cause said substantially constant direct current to flow through said inductance means and said load in a second polarity, and for charging said capacitance means in a second polarity, (d) for rendering said first and fourth controllable switches conductive during a fourth interval of said recurrent sequence, whereby said first, second, third and fourth controllable switches are conductive, thereby reducing said voltage between said first and second intermediate terminals to zero, and creating paths including said first, second, third and fourth switches by which said inductance means can ring with said capacitance means to form a second ringing current in such a manner that the current flow in said second and third switches is decreased by said ringing current, and (e) for rendering said second and third controllable switches nonconductive at a time when the current therethrough is less than one-half said substantially constant direct current, whereby only said first and fourth controllable switches are conductive to begin another said first interval of said recurrent sequence.

4,688,166

DIRECT MEMORY ACCESS CONTROLLER SUPPORTING MULTIPLE INPUT/OUTPUT CONTROLLERS AND MEMORY UNITS

Glenn H. Schneider, Phoenix, Ariz., assignor to Motorola Computer Systems, Inc., Cupertino, Calif.

Filed Aug. 3, 1984, Ser. No. 637,447
Int. Cl.[4] G06F *13/28*
U.S. Cl. 364—200 **1 Claim**



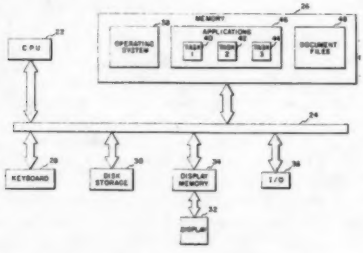
1. In a data processing system comprising a central processing unit, at least two memory units each storing instructions and data for processing by said central processing unit, and at least two input/output controllers each requiring access to each of said memory units, the improvement wherein said data processing system further comprises a direct access memory controller coupled between said input/output controllers and said memory units, said memeory controller enabling either input/output controller to access either of said memory units directly without generating a processor interrupt operation in said processing unit and without interrupting the operation of the other memory unit, and wherein said memory controller comprises multiplexer means coupled to said input/output controllers, said multiplexer means comprising means for coupling a first one of said input/output controllers to a first one of said memory units, and means for coupling a second one of said input/output controllers to a second one of said memory units in a time-division multiplexed manner.

4,688,167

SCREEN MANAGER FOR DATA PROCESSING SYSTEM

Arun K. Agarwal, Chelmsford, Mass., assignor to Wang Laboratories, Inc., Lowell, Mass.

Filed Sep. 27, 1984, Ser. No. 655,280
Int. Cl.[4] G06F *3/14*
U.S. Cl. 364—200 **43 Claims**



1. In a data processing system comprising a CPU controlled through an operating system and application tasks so as to be able to process multiple application tasks together, a data storage memory, a keyboard for interacting with application tasks, and a video display, having a physical display screen, responsive to the application tasks, the operating system having a screen manager comprising:

means responsive to a plurality of application tasks to designate a plurality of virtual screens, all virtual screens corresponding to the same, single portion of the physical display screen;

means responsive to an input to the data processing system to select one of the virtual screens for display at said single portion of the physical display screen under control of an application task; and

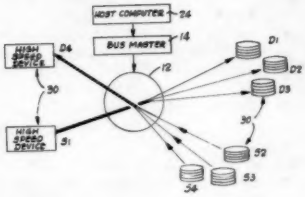
means for controlling display, at a second portion of the physical display screen, of identifiers corresponding to the designated virtual screens.

4,688,168

HIGH SPEED DATA TRANSFER METHOD AND APPARATUS

Donald A. Gudaitis, Euclid, Ohio; John P. McCaskey, Framingham, Mass., and Michael S. Hostetler, Twinsburg, Ohio, assignors to Picker International Inc., Highland Heights, Ohio

Filed Aug. 23, 1984, Ser. No. 644,023
Int. Cl.[4] G06F *3/04*
U.S. Cl. 364—200 **10 Claims**



1. A data communication system for transferring data at an enhanced data transfer rate comprising:

(a) a dual transmission bus, said bus having a data portion for the transmission of digital data messages and a control portion for allocating the transmission of data messages on the bus data portion;

(b) a plurality of communications units coupled to the transmission bus, each of said communications units including a data interface coupled to the data portion of said transmission bus;

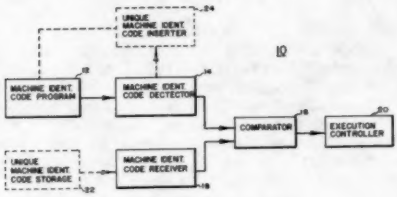
(c) a bus controller for coordinating data transmission on the bus between said communications units; said bus controller including (i) address control means having an address input coupled to the control portion of said bus and an address output coupled to said bus data portion for presenting source and destination addresses on the data portion of the bus; said address control means organized into one or more data transfer groups wherein each one of said data transfer groups includes multiple source and destination pairs, said source and destination pairs organized within a group to interleave data transfers between communications units within a transfer group to achieve a data transmission bandwidth greater than the maximum continuous data transfer bandwidth of one or more of the communication units in the transfer group; and (ii) means for allocating bus cycles to the data transfer groups within the address control means; and

(d) programming means coupled to the control portion of the bus for transmitting said multiple source and destination pairs to said address control means.

4,688,169
COMPUTER SOFTWARE SECURITY SYSTEM

Bhagirath S. Joshi, 11 Sheffield Rd., Waltham, Mass. 02154

Filed May 30, 1985, Ser. No. 739,162
Int. Cl.[4] G06F *7/02*
U.S. Cl. 364—200 27 Claims



1. A computer software security system for restricting execution of a program to a particular machine comprising:

first storage means for storing a machine identification code unique to said machine;

second storage means for storing a machine identification code in said program;

means, responsive to said second storage means, for determining the presence of said machine identification code in said second storage means during execution of said program;

means, responsive to said first storage means, for retrieving said unique machine identification code from said first storage means;

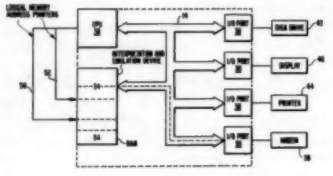
means, responsive to said means for determining and said means for retrieving, for comparing said unique machine identification code from said first storage means with said machine identification code in said second storage means; and

means, responsive to said means for comparing, for preventing further execution of said program unless both said machine identification codes are present and match.

4,688,170
COMMUNICATIONS NETWORK FOR COMMUNICATING WITH COMPUTERS PROVIDED WITH DISPARATE PROTOCOLS

David P. Waite, Alexandria, and Horace G. Riddell, Chantilly, both of Va., assignors to Tau Systems Corporation, Falls Church, Va.

Filed Sep. 22, 1983, Ser. No. 534,687
Int. Cl.[4] G06F *3/00*
U.S. Cl. 364—200 10 Claims



1. In a communications network involving a plurality of diverse stand-alone computers, each computer provided with an input/output port and communicating via data lines in synchronous or asynchronous modes, and each computer utilizing protocols including but not limited to a data format and bit rate specific to that computer, the improvement comprising:

a plurality of first initiating diverse stand-alone computers provided in the communications network;

a plurality of second remote diverse stand-alone computers communicating with said first computers via the communications network;

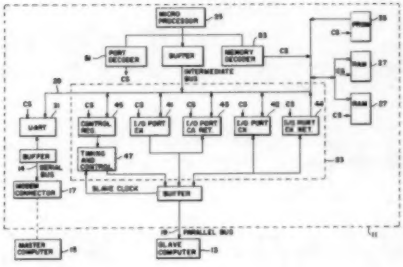
a single memory unit physically provided in each of said plurality of first initiating diverse stand-alone computers containing data information stored therein indicating the protocols, including the data format and bit rate of each of said plurality of first and second diverse stand-alone computers in the communications network, said data information including a data packet indicating the nature of, the absence or presence of a parity bit, the word length of said data information, the absence or presence of a cyclic redundancy check and whether said data information is in a synchronous or asynchronous mode, said memory unit connected to the input/output port of its respective computer; and

emulation means physically provided in said plurality of first computers and connected to said memory unit of each of said first computers for sending and receiving data utilizing the protocols of said plurality of first computers and said plurality of said second computers, including the data format and the bit rates of both said plurality of first and said plurality of second computers in the communications network, said data information including a data packet indicating the nature of, the absence or presence of a parity bit, the word length of said data information, the absence or presence of a cyclic redundancy check and whether said data information is in a synchronous or asynchronous mode to the input, whereby each of said first computers can automatically communicate with computers in both of said plurality of first and said plurality of second computers in the communications network based upon the storage, in the memory unit of each of said plurality of first computers, of the protocols, including the data format and the bit rate utilized by said plurality of first and said plurality of second computers in the communications network and regardless of whether said plurality of second computers is provided with said single memory unit or said emulation means.

4,688,171
SERIAL BUS FOR MASTER/SLAVE COMPUTER SYSTEM

Ahmed E. Selim, Haledon, and Thomas O. Weilbacker, Northvale, both of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Jul. 13, 1983, Ser. No. 513,542
Int. Cl.[4] G06F *13/40*
U.S. Cl. 364—200 17 Claims



1. In a system in which a first computer is used to control operation of a second computer, an interface circuit characterized by:

(a) a first computer bus communicating with the first computer;

(b) a second computer bus communicating with the second computer;

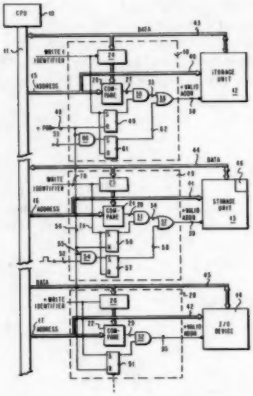
(c) an intermediate bus;
(d) at least one port means connecting the intermediate bus and the first computer bus;
(e) at least one additional port means connecting the intermediate bus and the second computer via the second computer bus;
(f) timing and control means, connected to the intermediate bus and to the second computer bus;
(g) digital processor means connected to the intermediate bus and controlling the ports and the timing and control means in response to control information from the first computer;
(h) memory means connected to the digital processor means for storing information appearing on the intermediate bus, the processor means controlling a transfer of information from the memory means to the intermediate bus such that, when the information fits within predetermined criteria, the information is transferred from the memory means to one of the computer buses through one of the ports.

4,688,172

INITIALIZATION APPARATUS FOR A DATA PROCESSING SYSTEM WITH A PLURALITY OF INPUT/OUTPUT AND STORAGE CONTROLLER CONNECTED TO A COMMON BUS

Charles G. Wright, Round Rock, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 13, 1984, Ser. No. 670,504
Int. Cl.[4] G06F *13/36*
U.S. Cl. 364—200 **9 Claims**



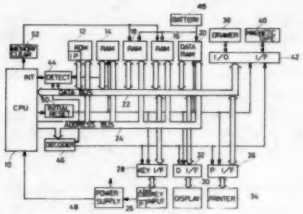
1. In a data processing system comprising
a central processor,
a common data bus connected to said central processor,
a plurality of controllers connected to said common bus, each controller respectively interfacing between said central processor and at least one storage unit or input-/output device,
means in said central processor for including in addresses sent on said common bus, identifier segments indicating the respective controller to which address is being sent, and
programmable comparison means in each controller for comparing said identifier segment to a stored controller identifier representing said controller,
the improvement comprising:
a read-only initialization program stored in one of said storage units, said controller interfacing with said one storage unit being a master controller,
means in said master controller selectively activated during initialization for accepting all addresses irrespective of the identifier segment, and
means in each of said other controllers selectively activated during initialization, for disabling the programmable comparison means in each whereby no addresses are accepted by said other controllers.

4,688,173

PROGRAM MODIFICATION SYSTEM IN AN ELECTRONIC CASH REGISTER

Akira Mitarai, Yamatokoriyama, and Kunio Kubota, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Apr. 22, 1983, Ser. No. 487,667
Claims priority, application Japan, Apr. 26, 1982, 57-70837; Apr. 27, 1982, 57-72301; Apr. 28, 1982, 57-71894; Apr. 29, 1982, 57-71684; May 7, 1982, 57-77124; May 8, 1982, 57-77306
Int. Cl.[4] G06F *13/00, 11/00*
U.S. Cl. 364—405 **7 Claims**



1. A program modification system in an electronic cash register comprising:
first memory means having a plurality of addresses for permanently memorizing a fixed operation program which controls an operation of the electronic cash register according to said fixed operation program associated with each of said plurality of addresses;
second memory means, having the same plurality of addresses as said first memory means, for storing modification instructions at each respective address for which a program modification should be conducted at each of the corresponding addresses of the fixed operation program memorized in said first memory means;
third memory means, having different addresses from said first memory means, for storing a modification program;
fourth memory means for storing an address table corresponding to the addresses of said first memory means and for storing the addresses of said third memory means having respective ones of said modification programs;
control means for executing a modified operation program which controls an operation of the electronic cash register, said modified operation program including a combination of steps of the fixed program in said first memory means and the modification program in said third memory means by introducing modification instructions from the modification program in said third memory means to addresses in said fourth memory means corresponding to said address table, to enable said control means to execute modification instructions in said second memory means on said fixed program at corresponding addresses in said first memory means;
a main power supply switch for supplying electric power to the electronic cash register; and
backup battery means for supplying electric power to said third and fourth memory means when said main power supply switch is switched off, thereby maintaining the modification program and associated address table stored in said third and fourth memory means when said main power supply switch is switched off;
said control means including an initial control system for transferring said modification instructions into said second

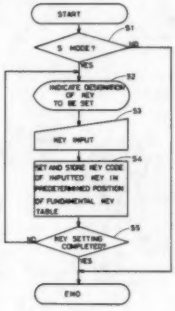
memory means in response to a switching-on operation of said main power supply switch and in accordance with the modification program and associated address table stored in said third and fourth memory means, respectively.

4,688,174

ELECTRONIC CASH REGISTER

Nobuyoshi Sakamoto, Nagaokakyo, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Apr. 6, 1984, Ser. No. 597,548
Claims priority, application Japan, Apr. 27, 1983, 58-75503
Int. Cl.[4] G07G *1/12;* G06C *7/02*
U.S. Cl. 364—405 **5 Claims**



1. An electronic cash register comprising:

key inputting means having a plurality of keys arranged on a keyboard of the cash register;

first storing means for storing first information representing a first group of functions to be performed by a first group of any keys out of the said plurality of keys;

second storing means for storing second information identifying functions to be performed by a second group of any keys out of said plurality of keys;

reading means for reading out said first function representing information from said first storing means;

indicating means responsive to the first information read out from the first storing means for sequentially indicating to an operator the first function represented by the first information;

mode selecting means for selecting one of a first mode for assigning said first group of functions to the first group of any keys and a second mode for assigning said second functions to the second group of keys;

first means responsive to the selection of said first mode by said mode selecting means for assigning to the first group of keys the first functions indicated by the indicating means;

said second function identifying information being specified by operation of said first group of keys to which the functions represented by the first information read out from the first storing means have been assigned by said first means; and

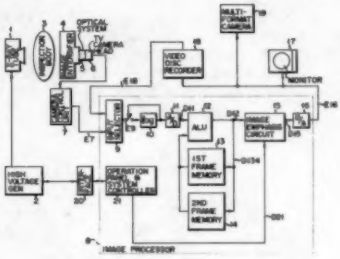
second means responsive to the selection of said second mode by said mode selecting means for assigning to the second group of keys the second functions identified by the second information by actuation of the first group of function-assigned keys.

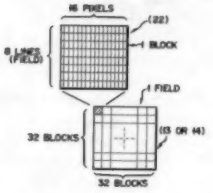
4,688,175

IMAGE PROCESSOR WITH AUTOMATIC SETTING OF WINDOW WIDTH AND LEVEL FOR INDIVIDUAL BLOCKS OF THE IMAGE

Makoto Kaneko; Ichiro Ogura, both of Ootawara; Hiroshi Asahina, Tochigi, and Hiroshi Yasuhara, Ootawara, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 28, 1984, Ser. No. 655,740
Claims priority, application Japan, Sep. 30, 1983, 58-182683
Int. Cl.[4] G06F *15/68;* G01N *23/04;* H05G *1/64;* H04N *5/32*
U.S. Cl. 364—414 **13 Claims**





1. An image processing apparatus comprising: frame memory means for storing information of an image to be displayed;

block memory means coupled to said frame memory means, for dividing said information stored in said frame memory means into a given number of information blocks, and for then storing said information blocks;

calculating means coupled to said block memory means for calculating a value of each of LEVEL and WIDTH data according to the contents of said information blocks; and

window processing means coupled to said calculation means which is responsive to said information of said image to be displayed, for processing said information of said image to be displayed according to said determined value of each of said LEVEL and WIDTH data, said window processing means providing output data used for an image display.

10. An image processing apparatus comprising:

frame memory means for storing data for an image to be displayed;

block memory means, coupled to said frame memory means, for dividing said image data stored in said frame memory means into a predetermined number of segments, and storing the segments of said image data;

image enhancing means, coupled to said block memory means, including window processing means for changing the light intensity of said image data by comparing said image data against a Level as a threshold, and a Width as a range, and selectively increasing or decreasing the light intensity of said image data according to the result of said comparing to improve the contrast of image, and means for determining said Level and Width according to the distribution of the segments of said image data; and

means, coupled to said image enhancing means, for supply-

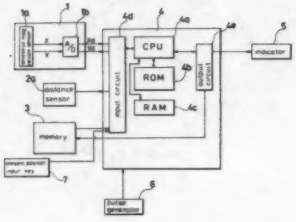
ing an output of said image enhancing means to a display for displaying said image improved in contrast.

4,688,176

NAVIGATOR FOR USE ABOARD A VEHICLE

Seiichiro Hirata, Nagaokakyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 22, 1985, Ser. No. 725,631
Claims priority, application Japan, Apr. 27, 1984, 59-86821
Int. Cl.[4] G06F *15/50*
U.S. Cl. 364—449 **4 Claims**



1. A navigator for use aboard a vehicle, comprising:

first means for detecting the running distance of the vehicle and producing an output signal corresponding thereto;

second means for detecting an angle of the advancing direction of the vehicle relative to terrestrial magnetism and producing an output signal corresponding thereto;

arithmetic operational means for performing an arithmetic calculation of the coordinates of the position of the vehicle in response to said output signals from said first and second detecting means and a compensation coefficient;

memory means for storing data on the coordinates of points of correction set at intersections of roads on a map of the area in which the vehicle is traveling, the distances between said points of correction, and the angles of roads branching from the points of correction relative to terrestrial magnetism;

locating means for judging whether the vehicle is within a predetermined distance from a point of correction by comparing the coordinates of the position of the vehicle from the arithmetic operational means with the coordinates of said points of correction stored in said memory means;

means for judging whether the vehicle has made a turn in a first area, when the position of the vehicle is judged to be within the first area by comparing the advancing direction of the vehicle with directions of the branching roads stored in said memory means, and specifying the point of correction in said first area as a first reference point of correction and a point of correction in a second area in the advancing direction of the vehicle as a second reference point of correction; and

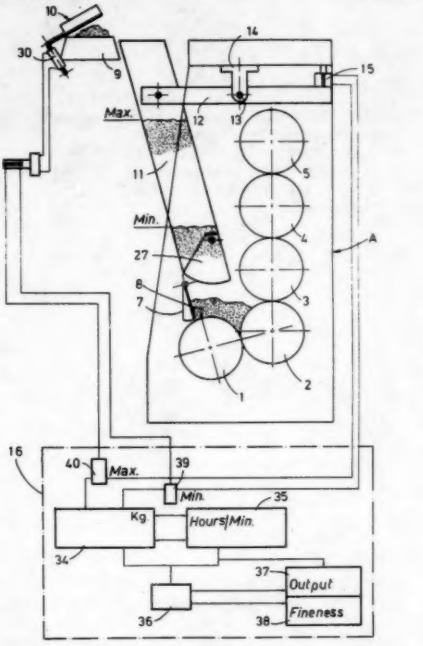
second arithmetic operational means for performing an arithmetic calculation of the ratio of the distance between the first and second reference points of correction obtained from the memory means to the distance between the first and second reference points of correction obtained from said first detecting means, to obtain said compensation coefficient.

4,688,177

CHOCOLATE FEEDING DEVICE FOR CHOCOLATE REFINERS

Sergio Ripani, and Giulio Serafini, both of Milan, Italy, assignors to Carle & Montanari S.p.A., Milan, Italy

Filed May 6, 1985, Ser. No. 731,156
Claims priority, application Italy, May 10, 1984, 20862 A/84
Int. Cl.[4] G06F *15/46;* **B02C** *25/00*
U.S. Cl. 364—468 **3 Claims**

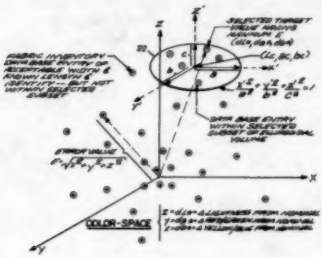


1. A chocolate-feeding device for chocolate refiners having a receiving chamber and a pair of feed rollers, a feeding conveyor, a feeding hopper adjacent said conveyor for feeding chocolate to said receiving chamber of the chocolate refiner, and further comprising, in combination, chocolate pick-up means in the form of a single blade disposed above said conveyor and mounted traversally to said conveyor, a slider of the screw nut type carrying said blade, a travel screw mounted substantially parallel to the length of said hopper and receiving said slider, a reversible motor for rotating said screw nut, limit stops for reversal of motion of said blade for loading chocolate in said hopper with alternately deposited superimposed chocolate layers, a bottom closure wall for said hopper, said wall being in form of a swingable shield, a double-acting pneumatic unit connected to said shield to control its opening and closing movements, a cross-member centrally pivoted and supporting said feeding hopper, an electric load call carried by said cross-member to indicate the quantity of chocolate in the hopper, said receiving chamber having a swingable front wall hingedly supported at its upper edge, an external spring biasing said front wall between an inward position corresponding to the minimum level of the chocolate in said chamber and an outwardly-swung position corresponding to the maximum level of chocolate in said chamber, an electric contact between said front wall and said biasing spring effective in the outwardly swung position of said front wall to close a circuit, and a control actuator having a solenoid valve in said circuit effective to control said doubleacting unit connected to said swingable shield of said feeding hopper.

4,688,178
METHOD AND APPARATUS FOR INVENTORY CONTROL TO OPTIMIZE USAGE OF COLORED FABRIC

Roland L. Connelly; Robert F. Willis; Jeremy D. Phelan, all of Greensboro, and Kathleen A. Nealen, Kernersville, all of N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

Filed Sep. 6, 1985, Ser. No. 773,216
Int. Cl.[4] G01N *21/25*; G01J *3/50*
U.S. Cl. 364—470 **20 Claims**



1. A method for selecting, from an existing inventory, a subset of colored fabric pieces which may be used together, each of the potentially acceptable fabric pieces in inventory having plural color parameters associated therewith which deviate to varying degrees from predetermined nominal values, said method comprising the steps of:

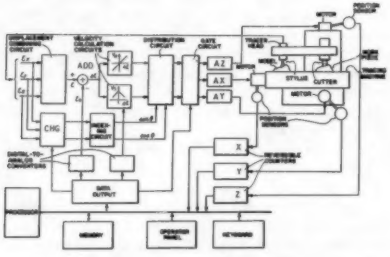
(a) identifying a target one of said fabric pieces having an associated parameter value which substantially deviates from the corresponding nominal value; and

(b) selecting a subset of said fabric pieces having associated color parameter values which are sufficiently near to those of said identified target piece as to be commonly usable therewith.

4,688,179
TRACER CONTROL SYSTEM

Etuo Yamazaki, Hachioji, Japan, assignor to Fanuc Ltd., Yamanashi, Japan

PCT No. PCT/JP84/00443, § 371 Date May 8, 1985, § 102(e) Date May 8, 1985, PCT Pub. No. WO85/01234, PCT Pub. Date Mar. 28, 1985
PCT Filed Sep. 13, 1984, Ser. No. 734,262
Claims priority, application Japan, Sep. 14, 1983, 58-170302
Int. Cl.[4] G06F *15/46*; G05B *19/18*
U.S. Cl. 364—474 **2 Claims**



1. A tracer control method which calculates a tracing direction and a tracing velocity on the basis of displacement signals from a tracer head and controls tracing of a concavity of a model, comprising the steps of:

(a) clamping the tip of the tracer head at a Z-axis position of a predetermined depth in the concavity of the model;

(b) performing contour tracing along the entire circumference of the inner wall of the concavity of the model while holding the tip of the tracer head in the clamped state and, while doing so, storing the coordinates of maximum and minimum points where a predetermined one of the X and Y coordinates of the tip of the tracer head has its maximum and minimum values on the contour tracing path;

(c) feeding the tracer head to a point inside one of the maximum and minimum points while maintaining it in the clamped state after completion of the contour tracing;

(d) effecting X-Y plane tracing relative to the inner wall of the concavity of the model from the abovesaid point to the other one of the minimum or maximum points of the concavity while retaining the tip of the tracer head in the clamped state; and

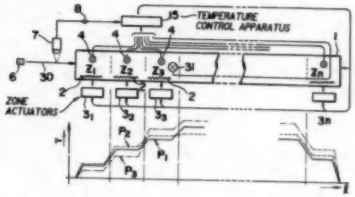
(e) further lowering the tip of the tracer head along the inner wall of the concavity of the model from the end position of the X-Y plane tracing and clamping it at a new Z-axis position of a predetermined deeper depth;

wherein the steps (b) to (e) are repeated in the newly clamped state until the tip of the tracer head reaches a further predetermined depth.

4,688,180
PATTERN-SWITCHING TEMPERATURE CONTROL APPARATUS

Takehiko Motomiya, Tokyo, Japan, assignor to Ohkura Electric Co., Ltd., Tokyo, Japan

Filed Dec. 10, 1985, Ser. No. 806,817
Claims priority, application Japan, Dec. 19, 1984, 59-266411
Int. Cl.[4] G06F *15/46*; F27D *3/00*
U.S. Cl. 364—477 **12 Claims**



1. A pattern-switching temperature control apparatus dealing with inter-zone interference for a multi-zone furnace with an intra-furnace thermometer means, each zone having a heating portion carrying a heating element and a heating-portion thermometer, comprising

a work setting element where a number representing a prescribed quantity of works of a kind to be heat-treated is set;

a temperature setting element on which a series of temperature settings (x_i) for individual heating portions of the furnace zones (Z_i) are set;

a memory adapted to store a plurality of temperature distribution patterns (P_{is}) for the furnace, a set of said numbers representing the prescribed quantities of works of different kinds to be heat-treated at corresponding ones of said temperature distribution patterns, a set of different series of temperature settings (x_{ir}) to be selectively set on said temperature setting element, and a set of inside temperatures (y_{ir}) detected by said intra-furnace thermometer means at different furnace zones when said temperature setting element carries corresponding ones of said settings (x_{ir});

a calculating means for calculating a heat transfer gains (g_{ir}) from said set of temperature settings (x_{ir}) and said set of inside temperatures (y_{ir}), calculating series of temperature settings (x_{is}) for said temperature distribution patterns (P_{is})

by using the heat transfer gains (g_{ir}), and storing the thus calculated series of temperature settings in said memory;

a counting means for counting the number of those works of one kind which are heat-treated by the furnace;

a setting means adapted, when count of said counting means coincides with said prescribed quantity of said one kind of works, to read out that number from the memory onto said work setting means which represents the presecribed quantity of the works to be heat-treated next and to read out said calculated series of temperature settings for the temperature distribution pattern to be used next from said memory; and

a regulating means adapted to control said heating element depending on difference between actual temperature detected by said heating-portion thermometer and temperature settings on said temperature setting element.

4,688,181

IMAGE TRANSFORMATIONS ON AN INTERACTIVE RASTER SCAN OR MATRIX DISPLAY

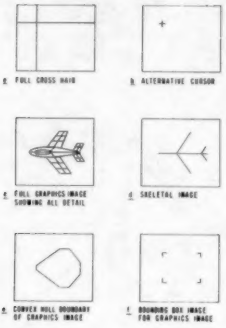
Roger L. Cottrell, Menlo Park, Calif., and Alan S. Murphy, Eastleigh, England, assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 537,996, Sep. 30, 1983, abandoned. This application Apr. 30, 1986, Ser. No. 859,845

Claims priority, application European Pat. Off., Dec. 22, 1982, 82306863.0

Int. Cl.[4] G06F *15/60*; G09G *1/06*

U.S. Cl. 364—521 **14 Claims**



7. An interactive raster-scanned display system including a microprocessor and random-access store operable to issue control signals to a drawing engine in order to display a full screen cross-hair cursor at a predetermined position on a display screen and further to display a full image of an object, the position of which on the screen is determined with reference to the position of the cursor, an input device responsive to user action to issue cursor position commands to said microprocessor effective in image transformation mode to move the cursor together with the image, or part of the image, progressively over the screen from one location to another, the movement of the cursor over the screen and the corresponding movement and/or change of shape of the image being effected by said drawing engine operating under microprocessor control repetitively to erase and redraw the cursor and the object image as required by the nature of the transformation being performed characterized in that in order to reduce the demands imposed on the drawing engine during such real-time transformation, control means are provided in said system arranged in operation to, upon and during execution of said image transformation mode to substitute for said full image to be transformed an alternative image representing said full image and for said full screen-cross-hair cursor an alternative cursor defining the same screen position as said full screen cross-hair cursor, said substitute image and substitute cursor each containing less detail to be drawn than the corresponding full image and full cursor they respectively represent, and said control means being further arranged in operation to, on completion of said transformation, replace the alternative image by said full image and said alternative cursor by said full screen cross-hair cursor.

4,688,182

METHOD AND APPARATUS FOR GENERATING A SET OF SIGNALS REPRESENTING A CURVE

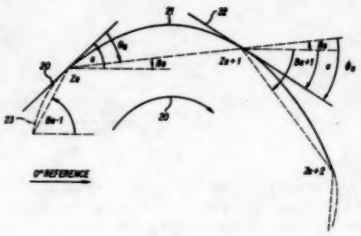
Ricky J. Schrieber, Great Neck, N.Y., assignor to Allied Corporation, Morris Township, Morris County, N.J.

Filed Sep. 10, 1984, Ser. No. 649,012

The portion of the term of this patent subsequent to Jun. 16, 2004, has been disclaimed.

Int. Cl.[4] G06F *15/72*; G09G *1/06*

U.S. Cl. 364—523 **11 Claims**



1. A method for (i) generating a series of signals representing nodes on a locus of a curve partially defined by a set of related knots, encoded as data on storage media, with said knots defining the end points of respective segments of said curve locus and with said knots being in a successive order in relation to said locus, and for (ii) encoding and decoding said node signals as data and for use of said data in an imaging process responsive to the shape for said curve segments as represented by said encoded data, comprising the steps of:

(a) defining the locations and the successive order of said knots of said curve locus and encoding as data on storage media, signals indicative of said knots,

(b) for a first knot, (Z_a), representing a first end point of a first curve segment, deriving a first angle, indicative of the average of the interknot angles between said first knot (Z_a), and selected related knots and encoding as data in computer memory, signals indicative of said first angle,

(c) at a second of said knots (Z_b), representing a second end point of said first curve segment, establishing a second angle for said first curve segment, and encoding as data in the computer memory, signals indicative of said second angle,

(d) establishing a compiler in computer memory, which compiler generates locus points for compiling data according to a predetermined cubic parametric polynomial function between a parameter "t", said knots and angles at said end points of a curve segment and the locus of a curve segment,

(e) establishing a limited range "R" of values for said parameter "t" in the compiler,

(f) in the computer memory, applying said signals indicative of the said locations of said first and second knots of said first curve segment, to said compiler,

(g) applying said signals indicative of the said first and second angles of said first curve segment to said compiler,

(h) applying a signal indicative of a distinct selected value of said parameter "t" within said range "R", to said compiler to derive a signal indicative of a respective node location on said first curve segment,

(i) repeating step (h) by applying signals indicative of additional distinct selected values of said parameter "t", within

said range "R", to derive a plurality of signals indicative of respective node locations on said locus of said first curve segment for respective distinct selected values of said parameter "t",

(j) encoding said signals derived in step (h) and (i), in a data base in memory for later sorting to represent said first curve segment for later generation of a visual representation of said curve by using said data signals directly to control a display process and visually display the pattern in the form of a curve,

(k) accessing said data base signals encoded in step (j), and

(l) controlling an imaging means responsive to said accessed signals to reproduce said curve.

4,688,183

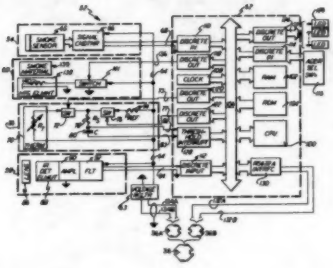
FIRE AND SECURITY SYSTEM WITH MULTI DETECTOR-OCCUPANCY-TEMPERATURE-SMOKE (MDOTS) SENSORS

Richard T. Carll, Granby, and Barry G. Blackaby, Avon, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 24, 1984, Ser. No. 685,938

Int. Cl.[4] G06F *15/74;* **G08B** *17/10, 29/00*

U.S. Cl. 364—554 **17 Claims**



1. Apparatus adapted to be disposed in a building space for measuring the environmental conditions of the space, comprising:

sensor means, for sensing the actual values of one or more parameters associated with the space environment, and for providing actual value sensed signals indicative thereof;

test means, disposed to provide actuation of said sensor means in response to a test command signal presented to said test means, said actuation causing said sensor means to provide test value sensed signals indicative of the operability of said sensor means; and

signal processing means, responsive to said sensor means, said test means, and to control signals presented thereto, for presenting said actual value sensed signals at an output thereof in response to a first control signal presented thereto, and for presenting said test command signal to said test means and for presenting said test value sensed signals from said sensor means to said output in response to a second control signal presented thereto.

4,688,184

SYSTEM FOR MEASURING THREE-DIMENSIONAL COORDINATES

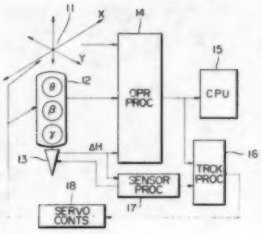
Ryosuke Taniguti; Hidenori Kohmo; Manabu Kubo, and Takashi Ikeda, all of Nagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Mar. 28, 1985, Ser. No. 716,922

Claims priority, application Japan, Mar. 29, 1984, 59-62507; Mar. 29, 1984, 59-62508

Int. Cl.[4] G01B *11/24*

U.S. Cl. 364—560 **2 Claims**



1. A system for measuring three-dimensional coordinates comprising:

position detecting means which detects orthogonal coordinate positions of X-, Y-, and Z-axes on a surface to be measured;

a noncontact-type displacement measuring instrument which moves along the surface to be measured;

a means for detecting and controlling the attitude of the displacement measuring instrument;

a coordinate operation processor which converts the data from said position detecting means, from said noncontact-type displacement measuring instrument, and from said detecting and controlling means into three-dimensional coordinates of the surface to be measured;

a computer which files and transfers to an external unit the coordinate data from said coordinate operation processor; and

a singular point determination processor which introduces the coordinate data from said coordinate operation processor, which extracts any singular points, and which transfers the coordinates thereof to said computer.

4,688,185

MICROWAVE ICE ACCRETION MEASURING INSTRUMENT

Bertram Magenheim, Bethesda, Md., and James K. Rocks, Leesburg, Va., assignors to University Research Foundation, Greenbelt, Md.

Continuation-in-part of Ser. No. 337,200, Jan. 5, 1982, Pat. No. 4,470,123, and a continuation-in-part of Ser. No. 596,340, Apr. 3, 1984. This application Aug. 10, 1984, Ser. No. 639,298

Int. Cl.[4] B64D *15/00;* **G01R** *27/04;* **G08B** *19/02;* **G01B** *15/00*

U.S. Cl. 364—563 **29 Claims**

1. An instrument for detecting the presence of and measuring the thickness of ice at a measuring location comprising:

a waveguide located to have its characteristics varied subject to ice accretion at said measuring location, said waveguide having an input port and a separate output port,

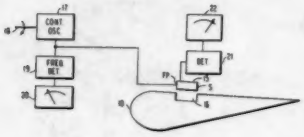
a controllable oscillator with a control input and an output, means connecting said output of said controllable oscillator to said waveguide input port,

sweep means connected to said control input to provide a control signal to cause said controllable oscillator to sweep in frequency as a function of time,

detecting means connected to said output port to provide a detection signal with at least one parameter varying as a

function of time and related to energy received by said detecting means at said output port,

peaking means responsive to said detecting means to provide a peaking signal with recognizable transitions corresponding to predetermined points of said detection signal, and



computing means responsive to said peaking signal for detecting ice presence and thickness at said measuring location.

4,688,186

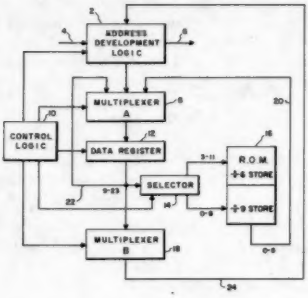
DIVISION BY A CONSTANT BY ITERATIVE TABLE LOOKUP

Charles W. Ferrell, Phoenix, and Thomas H. Howell, Scottsdale, both of Ariz., assignors to Honeywell Bull Inc., Phoenix, Ariz.

Continuation of Ser. No. 432,482, Oct. 4, 1982, abandoned. This application Jul. 8, 1985, Ser. No. 752,432

Int. Cl.[4] G06F *7/52*

U.S. Cl. 364—764 **2 Claims**



2. In a digital computer, an apparatus for dividing a dividend in the form of a binary number by a predetermined constant yielding a resulting quotient and a resulting remainder, said binary number comprising a plurality of binary bits having upper bits and lower bits, the uppermost bit being a most significant bit and the lowermost bit being a least significant bit, said apparatus comprising:

(a) storage means, for storing a plurality of quantities, each quantity stored in an addressable location having a value associated therewith, each quantity including a quotient portion and a remainder portion corresponding to a division of the value of the addressable location by said predetermined constant;

(b) first switching means, having first, second, and third input terminals, said first input terminal adapted to receive said dividend in response to a first control signal, and said second input terminal adapted to receive the quantity from said storage means in response to a second control signal, for outputting preselected data bits received on said first, second, and third input terminals in response to said first and second control signals;

(c) register means, operatively connected to said first switching means and having output terminals operatively connected to said third input terminals of the first switching means, for temporarily storing the data received from said first switching means in response to a third control signal;

(d) gating means, operatively connected to the output terminals of said register means and to said storage means, for coupling preselected data bits temporarily stored in said register means to said storage means, said preselected data bits including a predetermined portion of the dividend which is being divided, the preselected data bits being the value of the addressable location of the storage means thereby causing the storage means to output corresponding quotient portion and remainder portion in response to a fourth control signal; and

(e) output means, operatively connected to the output terminals of said register means, for providing an output signal comprising accumulated successive quotient portions temporarily stored in said register means, thereby yielding the resulting quotient and the resulting remainder in response to a fifth control signal.

4,688,187

CONSTRAINT APPLICATION PROCESSOR FOR APPLYING A CONSTRAINT TO A SET OF SIGNALS

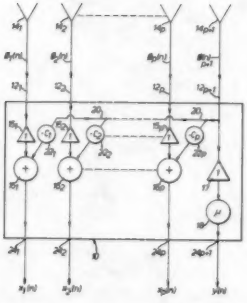
John G. McWhirter, Malvern Wells, England, assignor to Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Jul. 3, 1984, Ser. No. 627,625

Claims priority, application United Kingdom, Jul. 6, 1983, 8318333; Jul. 6, 1983, 8318269

Int. Cl.[4] G06G *7/00;* **H01Q** *3/26*

U.S. Cl. 364—825 **9 Claims**



1. A constraint application processor including:

input means adapted for receiving a main input signal and a plurality of subsidiary input signals;

means for (a) multiplying said main input signal by a plurality of constraint coefficients to provide a plurality of constraint values, said plurality of constraint coefficients corresponding to a constraint vector having coefficients not all of which are equal, and (b) subtracting respective ones of said plurality of constraint values from corresponding ones of said subsidiary input signals to provide a plurality of subsidiary output signals; and

means for applying a gain factor to the main input signal to provide a main output signal.

4,688,188

DATA STORAGE APPARATUS FOR STORING GROUPS OF DATA WITH READ AND WRITE REQUEST DETECTION

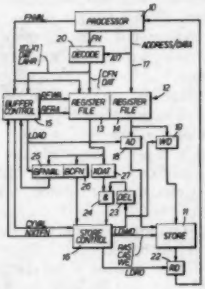
Ivan G. Washington, Stockport, Great Britain, assignor to International Computers Limited, London, England

Filed Dec. 14, 1984, Ser. No. 681,664

Claims priority, application United Kingdom, Jan. 24, 1984, 8401804

Int. Cl.[4] G06F *7/00*; G11C *7/00*

U.S. Cl. 364—900 **5 Claims**



1. Data storage apparatus comprising:

(a) a data store for storing a plurality of groups of data items,

(b) receiving means for receiving a series of requests for reading and writing individual data items from and to the data store,

(c) a buffer for storing a plurality of said requests, the buffer having a data input connected to the receiving means, a data output connected to the data store, a write address input, and a read address input,

(d) first addressing means coupled to the write address input of the buffer for producing a consecutive sequence of write addresses for writing said requests from the receiving means into the buffer in a predetermined order,

(e) second addressing means coupled to the read address input of the buffer for producing a consecutive sequence of read addresses for reading said requests from the buffer in the same predetermined order,

(f) detecting means, coupled to the receiving means, for detecting an incorrectly aligned read request, that is, one which occurs between two write requests relating to data items in the same group, and

(g) look ahead means connected to the read address input of the buffer and responsive to said detecting means, upon detection of said incorrectly aligned read request, for reading that request out of the buffer ahead of its normal turn, that is, before the request currently indicated by the read address from the second addressing means.

4,688,189

ELECTRONIC EQUIPMENT FOR STORING NUMBER OF SEARCHES OF INFORMATION

Osamu Hirata, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 352,263, Feb. 25, 1982, abandoned. This application Feb. 18, 1986, Ser. No. 830,255

Claims priority, application Japan, Mar. 6, 1981, 56-30995

Int. Cl.[4] G06F *9/00*

U.S. Cl. 364—900 **3 Claims**

1. An electronic device for searching information stored therein comprising:

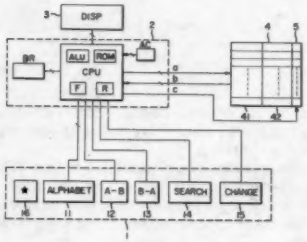
first memory means for storing a plurality of words of information;

means for entering words of search information into said device;

searching means connected to said entering means and to said first memory means for searching at least once for a desired word of information of said plurality of words of information;

second memory means connected to said searching means for storing a number of times each said desired word of information is searched by said searching means;

incrementing means, connected to said searching means and to said second memory means and being responsive to operation of said searching means to search for each said desired word of information, for incrementing the number of times searches are made for each said desired word of information stored in said second memory means;



PROCEDURE	KEY OPERATION	DISPLAY STATE OF DISPLAY DEVICE
1	A→B F L O	A→B FLO
2	SEARCH	A→B FLOAT
3	SEARCH	A→B FLOOR
4	SEARCH	A→B FLOWER
5	CHANGE	A→B ★ HANA
6	B→A H A N A	B→A HANA
7	CHANGE	B→A ★ ★ FLOWER
8	CHANGE	B→A ★ ★ HANA
9	A→B ★ ★ A	A→B ★ ★ A
10	SEARCH	A→B ★ ★ ABANDON
11	SEARCH	A→B ★ ★ ABIDE
12	SEARCH	A→B ★ ★ ABOARD

said searching means searching for said desired word of information on the basis of at least one word of search information enterred by said entering means, and on the basis of said stored number corresponding to the number of times said desired word of information has been searched;

visualizing means coupled to said searching means and to said first memory means for visualizing said desired word of information; and

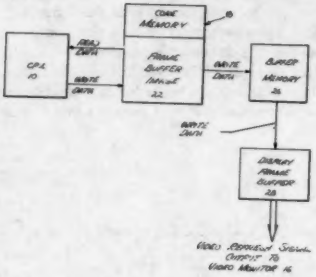
entering means for entering at least one word of information for search by said searching means and an anticipated number of searches for said desired word of information for search.

4,688,190

HIGH SPEED FRAME BUFFER REFRESH APPARATUS AND METHOD

Andreas Bechtolsheim, Stanford, Calif., assignor to Sun Microsystems, Inc., Menlo Park, Calif.

Filed Oct. 31, 1983, Ser. No. 547,398
Int. Cl.[4] G06F *3/153*
U.S. Cl. 364—900 **8 Claims**



1. An improved computer display system including a central processing unit (CPU) and display means for displaying images on a display, comprising:

main memory means directly coupled to said CPU for storing a plurality of data points representative of display elements defining a plurality of images to be displayed on said display, said data points being selectively updated directly by said CPU through read operating to determine a current status of said main memory means then selective desired write operations into said main memory means;

frame buffer means directly coupled to said display means for storing data points representative of display elements defining images currently being displayed, and periodically refreshing said display by outputting said selectively updated data points in order to display images defined by said updated data points;

buffer memory means directly coupled to said main memory means and to said frame buffer means for receiving and storing said updated data points from said memory means, and transferring said updated data points to said frame buffer means between periods when said frame buffer means is refreshing said display;

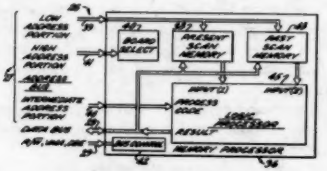
wherein images stored in said main memory means are updated by said CPU independently of said periods when said frame buffer means is refreshing said display.

4,688,191

SINGLE BIT STORAGE AND RETRIEVAL WITH TRANSITION INTELLIGENCE

John P. Conners, Thiensville, Wis., assignor to AMCA International Corporation, Hanover, N.H.

Filed Nov. 3, 1983, Ser. No. 548,302
Int. Cl.[4] G06F *13/00*
U.S. Cl. 364—900 **10 Claims**



1. In a digital computer system having a central processor and memory for storing multiple bit words of changeable data as a result of memory write operations executed by said central processor, the memory being interfaced to the central processor via a computer bus which includes an address bus and a data bus,

a memory processor connected to the computer bus and comprising, in combination,

(a) means responsive to a certain type of said memory write operations executed by the central processor for receiving and storing in second and first storage locations respective past and present multiple bit values of a data word, said second and first locations being addressed by corresponding addresses asserted on said address bus by said central processor, with the past value of the data word initially being transferred from said first to said second storage location and said present value of the data word being transmitted by said central processor over said data bus to said first location,

(b) means for performing one of a plurality of logic operations including detecting transitions in corresponding bits on past and present values held at a pair of storage locations identified by a given single address asserted on said address bus by said central processor during each one of certain memory read cycles executed by said central processor, and

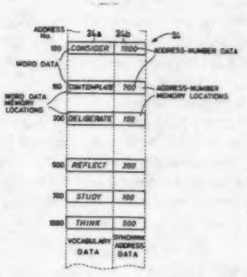
(c) means for transmitting over said data bus to said central processor during such read cycle either (i) a selected bit from the first storage location of the identified pair, (ii) the complement of a selected bit from the first storage location of the identified pair, or (iii) an indication of a transition in a selected bit of the identified pair of storage locations, said means (b) and (c) including means responsive to signals asserted on said address bus during such read cycle for uniquely selecting one of said actions (i)–(iii) depending on whether the address signals are respectively within a first, second, or third predetermined range of addresses.

4,688,192

ELECTRONIC DICTIONARY

Motokazu Yoshimura; Koichi Hirata, both of Nagoya, and Kimie Kurebayashi, Hiratsuka, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Jun. 28, 1984, Ser. No. 625,392
Claims priority, application Japan, Jun. 28, 1983, 58-116562
Int. Cl.[4] G06F *15/02, 15/38*
U.S. Cl. 364—900 **14 Claims**



1. An electronic dictionary to retrieve and display word data related to a word input into the dictionary comprising

an input means to insert the letters of a word into the electronic dictionary to retrieve related word data including

a plurality of character keys to insert character data representing a word,

and a call key means to signal proceeding to a next designated word;

a vocabulary storage section having a plurality of word data items;

related groups of word data items in said vocabulary storage

section with each of said related groups of word data items forming a closed loop beginning and ending with the character data;

a word data memory location in said vocabulary storage section for storing each of said word data items;

an identifying address appendixed to each of said word data items and included in said closed loop of that related group;

address number datam also appendixed to each of said word data items and also included in said closed loop of that related group;

an address number memory location for storing each of said address number datam;

a working memory means for storing character data entered through said character keys;

search means for searching, upon activation of said call key means, said word data memory locations having said word data item represented by said character data entered by said character keys;

first retrieval means for retrieving said address number datam stored in said address number memory location corresponding to said word data memory location of said word data item to which said address number datum is appendixed and corresponding to said word data memory location searched by said search means;

second retrieval means for retrieving said word data item stored in said word data memory location designated by said identifying address corresponding to said address number datum retrieved by said first retrieval means;

display means for indicating said word data item retrieved by said second retrieval means as related to said character data;

said first retrieval means operating upon each signal from call key means to retrieve said address number datum stored in said address number memory location corresponding to said word data memory location of said word data item to which said address number datum is apppendixed and corresponding to said word data item last retrieved by said second retrieval means;

said second retrieval means, upon each operation of said first retrieval means, retrieving said word data item stored in said word data memory location designated by said identifying address corresponding to said address number datum retrieved by said first retrieval means;

said first and second retrieval means operating in a closed loop of one of each of said related groups of word data items determined by said character data entered by said character keys; and

means to exit from the closed hoop with clearing of the display means.

4,688,193

BIT PROCESSING UTILIZING A ROW AND COLUMN LADDER SEQUENCE

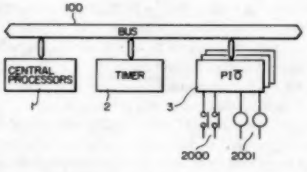
Hiromasa Yamaoka; Tadashi Okamoto, both of Hitachi; Yuzaburo Iwasa, Toukai, and Kouichi Kimura, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 27, 1984, Ser. No. 635,153

Claims priority, application Japan, Aug. 1, 1983, 58-139445

Int. Cl.[4] G06F *9/00*

U.S. Cl. 364—900 **8 Claims**



1. A method for processing a sequence control for a ladder sequence consisting of constituent elements including input contacts and output devices functionally arranged in i columns and j rows, comprising the steps of:

(a) dividing said i columns out of said constituent elements of i columns and j rows into blocks of columns each including a predetermined plural number of columns;

(b) storing an instruction in a memory unit for each row in said block of columns, said instruction being composed of a control portion including a bit indicating start of sequence and a bit for discriminating whether relay contact information is to be taken in or issued, a first operation code portion indicating whether input contacts of the ladder sequence are normally-OFF contacts or normally-ON contacts, a second operation code portion including bits for discriminating the presence or absence of connection between the adjacent columns, and an input/output address portion indicating addresses of the input contacts and output devices;

(c) obtaining bit information corresponding to the ON/OFF condition of the input contacts for each row of said block of columns; and

(d) processing the bit information for each row in said block of columns with a clock signal in accordance with said instruction stored in said memory means.

4,688,194

MULTI-RANGE CONTROLLER

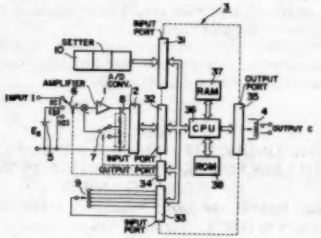
Osamu Shimizu, Tokyo, Japan, assignor to Ohkura Electric Co., Ltd., Tokyo, Japan

Filed Oct. 25, 1984, Ser. No. 664,758

Claims priority, application Japan, Nov. 18, 1983, 58-218550

Int. Cl.[4] G06F *15/20*

U.S. Cl. 364—571 **1 Claim**



1. A multi range controller comprising:

an amplifier having an input switch, said input switch selectively connecting an input signal I, ground, and a reference voltage Es to an input of the amplifier one at a time, said amplifier generating output signals D_I, D_o, and D_s corresponding to said input signals I, ground and reference voltage E_o, respectively;

an analog-to-digital (A-D) converter connected to an output of said amplifier;

a range-selection switch having a plurality of switch positions for selecting different measurement ranges respectively, so as to designate a selected range by setting the range-selection switch to a switch position which corresponds to said selected range;

an amplification controller coupled to said amplifier and connected to said range-selection switch, said amplification controller modifying an amplification factor of said amplifier depending of said selected range; and

a control unit having a memory and being connected to said input switch, said control unit further having a drift-compensation means for actuating, in response to the input signal I, said input switch for connecting the input of the amplifier sequentially to the input signal I, ground, and the reference voltage Es, said control unit storing the corre-

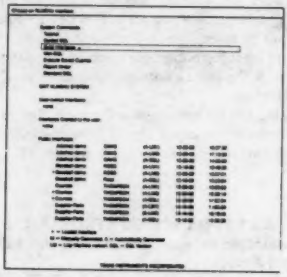
sponding amplifier outputs D_f, D_o, and D_b, respectively in the memory, thereafter said drift-compensation means producing a corrected output signal Ei for the input signal I wherein $Ei = Ex(D_f - D_o)/(Dx = D_o)$.

4,688,195

NATURAL-LANGUAGE INTERFACE GENERATING SYSTEM

Craig W. Thompson, Plano, and Kenneth M. Ross, Bedford, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 28, 1983, Ser. No. 461,881
Int. Cl.[4] G06F 1/00
U.S. Cl. 364—300 **8 Claims**



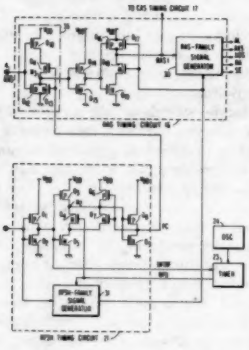
1. A method for generating a context-free grammar comprising the steps of:
(a) generating a domain-independent core grammar;
(b) generating a domain-independent core lexicon;
(c) generating a domain specification directed to a predetermined application; and
(d) inserting the domain specification into the domain-independent core grammar and lexicon to define a domain dependent context-free grammar.

4,688,196

SEMICONDUCTOR DYNAMIC MEMORY DEVICE WITH LESS POWER CONSUMPTION IN INTERNAL REFRESH MODE

Yasaburo Inagaki, and Kazuo Nakaizumi, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Sep. 6, 1984, Ser. No. 647,573
Claims priority, application Japan, Sep. 6, 1983, 58-163457
Int. Cl.[4] G11C 7/00
U.S. Cl. 365—222 **14 Claims**



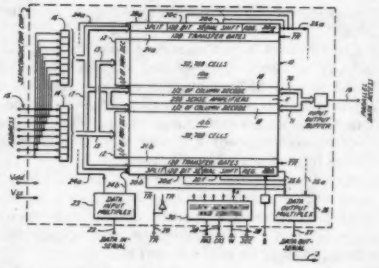
1. A memory device comprising a memory cell array having a plurality of memory cells arrayed in a matrix, an internal self-refresh circuit for refreshing at least one of said memory cells, a first terminal receiving a control signal for selectively controlling data write operations and data read operations with respect to a selected memory cell, an input circuit supplied with said control signal through said first terminal and including first and second transistors each having a control electrode connected to said first terminal and coupled in series with each other, a third transistor connected in series with said first and second transistors, means responsive to the commencement of operation of said internal self-refresh circuit for deactivating said third transistor, and means for maintaining the deactivated state of said third transistor over the whole period of operation of said internal self-refresh circuit, whereby said input circuit consumes substantially no power when said internal self-refresh circuit is in operation.

4,688,197

CONTROL OF DATA ACCESS TO MEMORY FOR IMPROVED VIDEO SYSTEM

Mark F. Novak; Karl M. Guttag, and Donald J. Redwine, all of Houston, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 30, 1983, Ser. No. 566,860
Int. Cl.[4] G11C 8/00
U.S. Cl. 365—230 **15 Claims**



1. A dual-port memory device, comprising:
an array of memory cells;
address terminals;
a data input terminal;
a data output terminal;
means, responsive to address signals received by said address terminals, for addressing a memory cell in said array;
random input means for writing data received by said data input terminal to the memory cell addressed by said addressing means;
random output means for presenting the contents of the memory cell addressed by said addressing means to said data output terminal;
a register comprised of a plurality of memory cells;
a transfer control terminal;
a serial clock terminal;
means, coupled to said array and to said register, for transferring the contents of a plurality of memory cells in said array into memory cells in said register, said transfer occurring responsive to a transfer signal received by said transfer control terminal;
a serial output terminal;
serial output means, connected to a memory cell in said register and to said serial output terminal, for communicating to said serial output terminal the contents of said memory cell in said register connected thereto; and
means, responsive to a shift signal received by said serial clock terminal, for shifting the contents of another mem-

ory cell in said register to said serial output means so that, responsive to a series of said shift signals received by said serial clock terminal, the contents of a series of memory cells in said register are communicated to said serial output terminal;

wherein said transferring means is disabled after said contents of said plurality of memory cells in said array are transferred into said register, so that said random input means and said random output means may write and present, respectively, the contents of memory cells in said array addressed by said addressing means independently from said serial output means communicating the contents of a series of said memory cells in said register to said serial output terminal;

and wherein said serial output means communicates the contents of said memory cell in said register connected thereto to said serial output means after a transfer by said transfer means and prior to the first shift signal received by said serial clock means after said transfer by said transfer means.

4,688,198

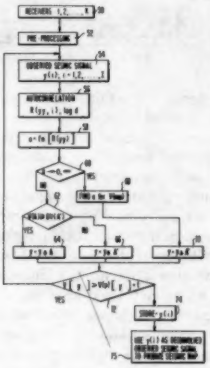
ENTROPY GUIDED DECONVOLUTION OF SEISMIC SIGNALS

Ralphe Wiggins, Ridgefield, Conn., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Dec. 24, 1984, Ser. No. 684,811

Int. Cl.[4] G01V *1/37*

U.S. Cl. 367—46 **35 Claims**



1. A seismic exploration method comprising:

deriving an observed seismic signal related to the interaction of a seismic source wavelet with subsurface formations;

cumulatively modifying the observed signal by a sequence of operators selected both on the basis of a least squares technique and on the basis of their effectiveness in reducing entropy; and

using the cumulatively modified observed signal as an estimate of seismic properties of said subsurface formations.

4,688,199

TRANSDUCERS AND CONTROL MEANS

Michael W. B. Lock, Bedford, England, assignor to Internationale Octrooi Maatschappij "Octropa" BV, Rotterdam, Netherlands

Filed Jul. 5, 1985, Ser. No. 751,952

Claims priority, application United Kingdom, Jul. 6, 1984, 8417241

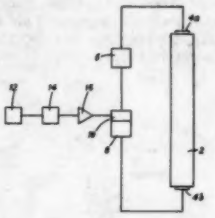
Int. Cl.[4] H04B *1/02*

U.S. Cl. 367—137 **9 Claims**

1. A method of operating a pair of ultrasonic transducers to produce a moving standing wave in a fluid medium by interaction of the outputs of said transducers, comprising the steps of:

producing respective signals to drive the transducers, an interlocked phase difference existing between said respective signals;

producing a control signal to progressively change said phase difference; and



regulating said control signal to produce a stepwise cyclically varying phase difference between the transducers to introduce a sequence of momentary phase changes between the transducer-driving signals, to cause the standing wave to move in a manner dependent upon said regulating of said control signal.

4,688,200

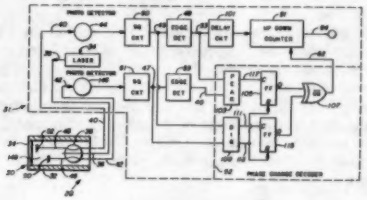
OPTICAL SYSTEM FOR DETECTING ACOUSTIC WAVE ENERGY IN A FLUID MEDIUM

Thomas J. Poorman; David Grissom, both of Houston, Tex., and Edward F. Carome, Berkley, Calif., assignors to Western Geophysical Company of America, Houston, Tex.

Filed Sep. 18, 1985, Ser. No. 777,322

Int. Cl.[4] H04R *1/02*; G01B *9/02*

U.S. Cl. 367—149 **20 Claims**



1. An optical system for generating a signal related to acoustic wave energy in a fluid medium comprising:

a source of coherent optical radiation;

optical waveguide means for defining a first pair of optical paths adapted so that different lengths of said first pair of paths are exposed to acoustic wave energy in the fluid medium;

first means for coupling coherent optical radiation from the source into each of said first pair of optical paths;

optical waveguide means for defining a second pair of optical paths;

second means for cross coupling optical radiation from each of said first pair of paths into each of said second pair of paths, so that interference fringes are generated in said second pair of paths as the result of said acoustic wave energy, said second means being adapted so that the phase of said interference fringes in the two paths of said second pair of paths will be different and so that the difference will be substantially different from 180°; and

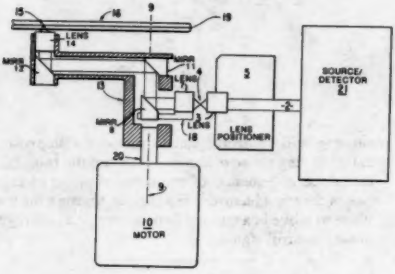
signal processing means responsive to the quantity of interference fringes in a first one of said second pair of paths

and to the phase relationship between the interference fringes in the second pair of paths for generating said signal related to the acoustic wave energy.

4,688,201
FOCUSING AND TRACKING APPARATUS FOR AN OPTICAL DATA STORAGE DEVICE

David K. Towner, and David K. Campbell, both of Boise, Id., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jan. 16, 1985, Ser. No. 692,278
Int. Cl.[4] G11B 7/00
U.S. Cl. 369—44 4 Claims



1. Apparatus for use in an optical data storage device having a rotating disc media for recording data along tracks in a recording layer, said apparatus comprising:

a chassis;

a source of light rigidly mounted on the chassis for emitting a beam of light;

intermediate beam adjusting means movably mounted on the chassis for receiving and transmitting light from the source;

objective lens means for focusing the beam of light into a spot; and

coarse positioning means, movably mounted on the chassis and mechanically independent from the intermediate beam adjusting means, the objective lens means being mounted thereon, said coarse positioning means for directing light received from the intermediate beam adjusting onto the recording layer of the rotating disc media, said intermediate beam adjusting means also being effective for adjusting at least two geometric properties of the beam of light.

4,688,202
TRACKING CONTROL SYSTEM FOR AN INFORMATION REPRODUCING APPARATUS

Toshiharu Mukai, Sennan, and Shinichi Tanaka, Kyoto, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Feb. 14, 1985, Ser. No. 702,215
Claims priority, application Japan, Feb. 16, 1984, 59-27524
Int. Cl.[4] G11B 21/10
U.S. Cl. 369—44 9 Claims

1. A tracking control system for an information reproducing apparatus comprising:

an information reading means for reading information recorded on a concentric or spiral information track of an information recording medium;

an actuator for actuating said information reading means;

a defect detection means coupled to said information reading means for producing a defect detection signal when said information reading means passes a defective portion on said information recording medium;

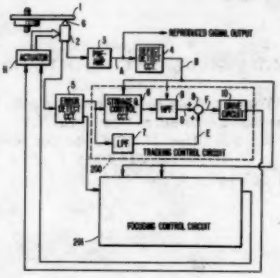
an error detection means coupled to said information reading means for producing an error signal indicating a position error of said information reading means for a position of said information track, a pulse noise being caused in said error signal at a time when said information reading means enters into said defective portion; and;

a position control means responsive to said error signal for producing a drive signal for driving said actuator to control said information reading means to trace on said information track,

wherein said position control means comprises:

a high-pass filter which normally passes high frequency components of said error signal to obtain a high frequency error signal, a time constant of said high-pass filter being normally set so that an amount of a storage quantity of a storage element included therein varies corresponding to variations of said error signal;

a low-pass filter which passes low frequency components of said error signal to obtain a low frequency error signal;



an adding means for adding said high frequency error signal and said low frequency error signal;

a drive means for producing said drive signal form an output signal of said adding means; and

a storage quantity control means which is coupled between said error detection means and said high-pass filter for normally passing said error signal from said error detection means to said high-pass filter, said storage quantity control means being responsive to said defect detection signal for blocking said error signal and applying a predetermined level signal to said high-pass filter so that said high-pass filter, due to an abrupt variation in an amount of said storage quantity caused by said predetermined level signal, produces a cancel pulse signal by which an abnormal movement of said information reading means caused by said pulse noise is stopped.

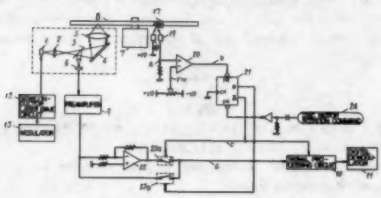
4,688,203
OPTICAL RECORDING AND REPRODUCING APPARATUS

Kenji Koishi, Hyogo; Tamotsu Matsuo, Osaka, and Isao Satoh, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

PCT No. PCT/JP84/00211, § 371 Date Dec. 21, 1984, § 102(e) Date Dec. 21, 1984, PCT Pub. No. WO84/04417, PCT Pub. Date Nov. 8, 1984
PCT Filed Apr. 23, 1984, Ser. No. 691,523
Claims priority, application Japan, Apr. 22, 1983, 58-71670
Int. Cl.[4] G11B 7/00, 20/10
U.S. Cl. 369—48 4 Claims

1. An optical recording and reproducing apparatus comprising: a first light source for converging a tiny light beam spot and projecting it onto an optical disc for performing one of recording and reproducing a signal on said optical disc, mark detecting means for detecting a mark indicating a recording

polarity of said optical disc which is provided in association with said optical disc, and control means for controlling a polarity of a signal to be recorded or reproduced in a positive



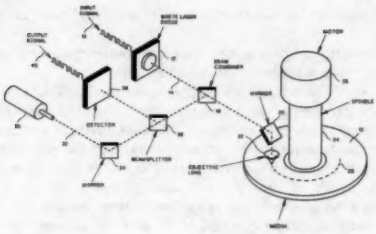
or negative direction in accordance with said mark detected by said mark detecting means, said mark being provided on one of a disc jacket containing an erasable optical disc and a disc jacket containing an unerasable optical disc.

4,688,204

PULSED OPTICAL DATA DETECTION SYSTEM

George I. Noyes, Jr., and Prabodh L. Shah, both of Boulder County, Colo., assignors to Storage Technology Partners II, Louisville, Colo.

Filed Nov. 16, 1984, Ser. No. 672,304
Int. Cl.[4] G11B *7/00*
U.S. Cl. 369—59 **15 Claims**



7. A data detection system for detecting the spacing between data transition marks recorded on a recording surface, said system comprising;

a data head positioned to sense said data transition marks, said data head including means for generating a data transition signal whenever one of said data transition marks passes by said head;

means for creating relative motion between said data head and said recording surface, whereby selected data transition marks pass by said head;

first delay means for generating a first delayed data transition signal that comprises said data transition signal delayed by a first prescribed time;

second delay means for generating a second delayed data transition signal that comprises said data transition signal delayed by a second prescribed time;

an input stage through which said data transition signal passes prior to being presented to said first delay means, said input stage serving to buffer said data transition signal prior to delaying it with said first and second delay means;

signal combining means for subtracting said data transition signal and said second delayed data transition signal from said first delayed data transition signal in order to generate a data transition pulse signal; and

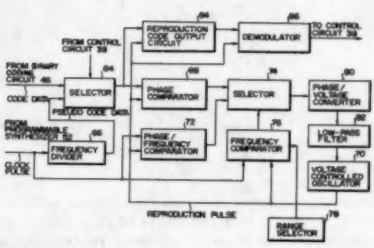
means responsive to said data transition pulse signal for changing the level or state of a logic data signal, whereby said logic data signal changes status in response to each data transition mark that passes by said head, said data logic signal thereby being representative of the data recorded on said recorded surface as detected by said data head.

4,688,205

DATA DEMODULATION APPARATUS

Takashi Abiko, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 26, 1985, Ser. No. 748,962
Claims priority, application Japan, Jun. 30, 1984, 59-135961
Int. Cl.[4] G11B *20/10, 5/09*
U.S. Cl. 369—59 **5 Claims**



1. A data demodulation apparatus comprising:

means for reading out code data from a recording medium, said code data having been modulated according to the timing of a clock pulse of a predetermined frequency and recorded in said recording medium;

generating means, supplied with said clock pulse and said code data, for generating a reproduction pulse synchronized in both phase and frequency with said clock pulse in a first mode (pull-in control), and a reproduction pulse synchronized in phase with said code data in a second mode (lock-in control);

means for demodulating code data according to the timing of said reproduction pulse;

comparing means, connected to said generating means, for comparing the frequency of said reproduction pulse with that of said clock pulse, for setting said generating means in the second mode, when a frequency difference between the reproduction pulse and the clock pulse is within a tolerable range, and for setting said generating means in the first mode, when the frequency difference is not within the tolerable range.

4,688,206

DEVICE FOR OPENING AND CLOSING A SHUTTER MEMBER OF A DISK CARTRIDGE

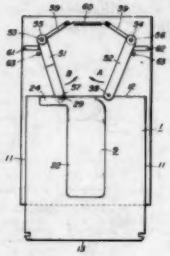
Kenzo Nakagawa, Kanagawa, and Masayuki Suzuki, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Sep. 10, 1986, Ser. No. 905,491
Claims priority, application Japan, Sep. 23, 1985, 60-209537
Int. Cl.[4] G11B *23/02, 5/12*
U.S. Cl. 369—291 **4 Claims**

1. In a signal recording and/or reproducing apparatus making use of a cartridge including a housing containing a disk as a signal recording medium, said cartridge housing having in an upper wall and a lower wall thereof signal read or write apertures, and a shutter member mounted movably on said housing so as to partially cover a front wall and said upper wall and lower wall of said cartridge housing and adapted for opening and closing said apertures, said shutter member having an engaging opening exposing said front wall and lower wall, said cartridge being insertable into the signal recording and/or reproducing apparatus along a predetermined path of insertion, and said apparatus including a device for opening and closing the shutter member, said device comprising:

a pair of shutter member opening and closing elements provided to the signal recording and/or reproducing appara-

tus so as to be in said path of insertion of said disk cartridge, said elements being rotatably mounted, having engaging portions adapted for selectively engaging in said engaging opening, and being rotated in response to a force applied by said disk cartridge when said disk cartridge moves along said path of insertion, said shutter member opening and closing elements being so designed that portions of said opening and closing elements strike each other to inhibit further movement of each other and to inhibit further movement of said disk cartridge along said path of insertion when the disk cartridge is inserted with a rear wall of said housing opposite to said front wall partially covered by said shutter member in opposing relation to said opening and closing elements.

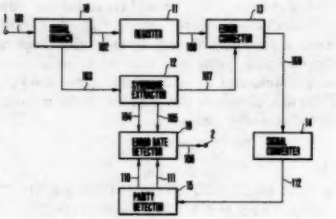


4,688,207

CHANNEL QUALITY MONITORING APPARATUS

Makoto Yoshimoto, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Oct. 21, 1985, Ser. No. 789,486
Claims priority, application Japan, Oct. 24, 1984, 59-223758
Int. Cl.[4] H04J *3/14*
U.S. Cl. 370—13 **6 Claims**



1. A channel quality monitoring apparatus provided in terminal equipment of digital radio communication system to monitor an error rate of a receiving signal, comprising:

syndrome generator means responsive to a digital multiplexed signal of said receiving signal to generate a syndrome for correcting code error;

converter means for converting the digital multiplexed signal which has undergone error correction based on said syndrome outputted from said syndrome generator means into a second digital multiplexed signal with which a predetermined parity detection is possible;

parity detector means for effecting a parity detection of said second digital multiplexed signal outputted from said converter means; and

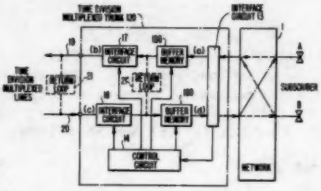
computing means responsive to outputs from said syndrome generator means and said parity detector means, wherein when occurrence of code error detected based on said syndrome generated in said syndrome generator means continues for the duration less than a predetermined time period, said computing means is operative to compute an error rate of said receiving digital multiplexed signal on the basis of said syndrome, while when occurrence of code error detected based on said syndrome continues for the duration equal to or more than said predetermined time period, said computing means is operative to compute an error rate of said receiving digital multiplexed signal on the basis of said output from said parity detector means.

4,688,208

TIME DIVISION EXCHANGE FOR CARRYING OUT A LOOP-BACK TEST

Tomohiro Kawaguchi, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Aug. 12, 1985, Ser. No. 764,583
Claims priority, application Japan, Aug. 15, 1984, 59-169277
Int. Cl.[4] H04J *1/16*
U.S. Cl. 370—15 **17 Claims**



1. A time division exchange for serving plural lines, comprising:

a network, coupled to the lines, for transmitting and receiving time division multiplexed signals;

a time division multiplexed trunk, coupled to said network, for providing, as an output time division multiplexed signal to another exchange, the time division multiplexed signal transmitted by said network, and for providing an input time division multiplexed signal to said network as the received time division multiplexed signal, said time division multiplexed trunk including means for interchanging predetermined time slots in one of the time division multiplexed signals when a loop-back test is to be performed; and

return means, coupled to said time division multiplexed trunk, for receiving the output time division multiplexed signal and for returning it to said time division multiplexed trunk, as the input time division multiplexed signal, during the loop-back test.

4,688,209

METHOD AND APPARATUS FOR LOOPING AROUND A DIGITAL TRANSMISSION LINE AT A CHANNEL UNIT

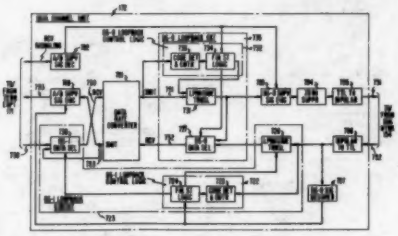
Frederick J. Banzi, Jr., Andover; Michael J. Dugan, Merrimac, both of Mass.; Randolph W. Johnson, Northbrook; Douglas D. Saylor, Naperville, both of Ill., and Craig A. Sharper, Bradford, Mass., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Nov. 27, 1984, Ser. No. 675,121
Int. Cl.[4] H04J *1/16*
U.S. Cl. 370—15 **16 Claims**

1. For use with a digital transmission line having a plurality of channel units and a transmit and a receive path passing through each of said channel units, each of said channel units being responsive to a receipt of a first predetermined control code succeeded by a receipt of a second predetermined control code for interconnecting said transmit and receive paths passing therethrough and responsive to a first receipt of said first predetermined control code succeeded by a second receipt of said first predetermined control code for passing the second received said first predetermined control code and any subse-

quently received control codes therethrough; a method for interconnecting said transmit and receive paths passing through a predetermined channel unit to loop around said digital transmission line, comprising the steps of:

applying to one end of said line an individual said first predetermined control code for said predetermined channel unit and for each one of said channel units preceding said predetermined channel unit in said line, and



applying to said one line end said second predetermined control code for said predetermined channel unit after applying said first predetermined control code for each of said predetermined and preceding channel units, the time interval between successive applications of any of said first and second control codes to said one line end being arbitrary.

4,688,210

METHOD OF AND ARRANGEMENT FOR SYNCHRONIZING THE RECEIVER ARRANGEMENTS IN A DIGITAL MULTIPLEX TRANSMISSION SYSTEM

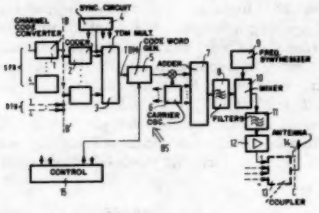
Alfons Eizenhöfer, Altdorf, and Christoph Grauel, Feucht, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 18, 1986, Ser. No. 841,134

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1985, 3511430

Int. Cl.[4] H04J *13/00, 4/00, 3/06;* **H04B** *1/00*

U.S. Cl. 370—18 **9 Claims**



1. In a digital multiplex transmission system comprising a base radio station having a transmitter and a plurality of mobile radio stations each having a receiver, channels for transmission of data symbols ($d_1 \ldots d_n$) from the transmitter to the respective receivers being established by employing different code distributions of such data symbols in respective channels, such data symbols being transmitted in time-synchronism with each other; a method of synchronizing the base station transmitter with the mobile station receivers, comprising:

insertion of respective synchronizing symbols ($S_1 \ldots S_n$) between successive data symbols transmitted in each of said channels, the synchronizing symbols in all channels being identical and the synchronizing symbols in each channel all being spaced at the same time intervals; and simultaneously transmitting the speech symbols in a plurality of said channels.

4,688,211

TELECOMMUNICATION SWITCHING SYSTEM

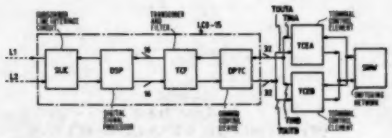
Francoise C. G. Van Simaeys, Brussels, and Pierre-Paul Guebels, Edegem, both of Belgium, assignors to Alcatel N.V., Amsterdam, Netherlands

Filed Feb. 15, 1985, Ser. No. 701,844

Claims priority, application Belgium, Feb. 21, 1984, 2/60343

Int. Cl.[4] H04Q *11/04;* **H04J** *3/00*

U.S. Cl. 370—58 **10 Claims**



1. A telecommunication switching system, comprising:

a plurality of terminal circuits;

a common control device associated with said plurality of terminal circuits, said common control device including a processor and control means;

a plurality of terminal control elements each operating asynchronously; and

a switching network, said terminal control elements coupling said common control device to said switching network, said control means functioning to successively allocate said processor to each of said terminal control elements.

4,688,212

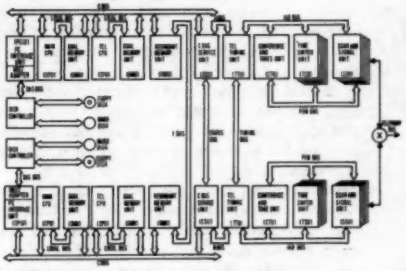
CENTRALIZED IMAGE RESPONSIVE TELEPHONE TIME SLOT INTERCHANGE SYSTEM

Gordon MacGinitie, Novato, and Thomas R. Eames, Petaluma, both of Calif., assignors to Harris Corporation, Melbourne, Fla.

Filed Jan. 31, 1985, Ser. No. 696,829

Int. Cl.[4] H04J *3/02*

U.S. Cl. 370—85 **35 Claims**



1. A method for detecting and reporting the occurrence of a random event in peripheral units connected by respective ports addressed through a time division multiplex scanning schedule, comprising the steps of:

(a) generating a clock signal;

(b) responsive to said clock signal, connecting said ports and signaling information generated at said ports, according to said scanning schedule, to a central store;

(c) storing said signaling information, generated at said ports according to said scanning schedule, at said central store;

(d) responsive to said signaling information being indicative

of a random event at any one of said ports, storing the identification of the respective port producing said event, in said central store;

(e) establishing an order of priority in said central store for responding to said ports;

(f) receiving an instruction code for a respective port and, step (d) includes the step;

(g) responsive to said instruction code, responding to the said random event signal.

4,688,213

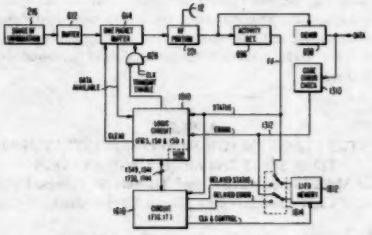
ASYNCHRONOUS RANDOM ACCESS COMMUNICATION SYSTEM WITH COLLISION RESOLUTION BASED ON TIME OF ARRIVAL

Dipankar Raychaudhuri, Kendall Park, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Nov. 29, 1985, Ser. No. 802,999

Int. Cl.[4] H04J 3/24

U.S. Cl. 370—93 **35 Claims**



1. An asynchronous random access contention system for communicating among a plurality of transmitter-receives by way of a transmission path, comprising:

transmission means associated with each transmitter-receiver adapted for receiving information to be transmitted, for forming the information into packets of uniform duration, and for originally transmitting said information at random times by way of said transmission path;

receiving means associated with each transmitter-receiver and adapted for receiving from said transmission path its own packet and other packets originating from other transmitter-receivers;

status determining means associated with each transmitter-receiver and coupled to said receiving means for establishing the presence of a collision involving only other packets, and for establishing the presence of a collision involving said own packet and in response thereto generating (a) a first signal if said own packet was first, and (b) a second signal if said own packet was last; and

control and rescheduling means associated with each transmitter-receiver and coupled to said transmission means and to said status determining means for inhibiting all transmission from said transmission means for a period equal to a predetermined number of said uniform durations in response to said collision involving only other packets, and for scheduling retransmission of said information during (a) a first portion of said period in response to said first signal and (b) a second portion of said period in response to said second signal.

4,688,214

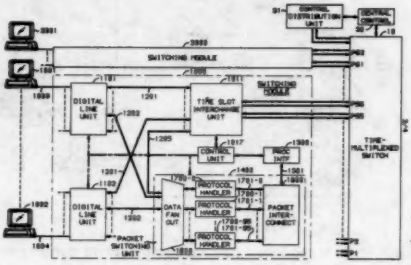
SWITCHING SYSTEM CONTROL ARRANGEMENTS

Gregory S. DeWitt, Buffalo Grove; John J. Driscoll, Naperville, and John L. Shepherd, Warrenville, all of Ill., assignors to American Telephone and Telegraph Company, AT&T Laboratories, Murray Hill, N.J.

Filed Mar. 12, 1986, Ser. No. 839,325

Int. Cl.[4] H04J 3/24, 3/12

U.S. Cl. 370—94 **12 Claims**



1. In an arrangement comprising a plurality of user access lines, each connecting at least one terminal end point having a terminal end point identifier to a switching arrangement for controlling communication between said terminal end points, wherein said switching arrangement comprises a control process for each communication in said switching arrangement and each control process is associated with a data structure including a terminal end point identifier and call reference value, the method comprising:

receiving a first message requesting a communication with a given user access line;

creating a control process associated with said requested communication;

creating a data structure including a first terminal end point identifier and a call reference value selected by the control process created in the preceding creating step;

transmitting a second message to the given user access line, said second message comprising said first terminal end point identifier and said selected call reference value;

transmitting, a third message by a given terminal end point connected to the given user access line, said third message comprising a terminal end point identifier of said given terminal end point and said selected call reference value;

identifying, in response to said third message, a data structure including said selected call reference value and said first terminal end point identifier; and

replacing said first terminal end point identifier, in the data structure identified in said identifying step, with the terminal end point identifier included in said third message.

4,688,215

DEMULTIPLEXER FOR TWO-STAGE FRAMING

Warren R. Fryer, New York, N.Y., assignor to Calculagraph Company, Hanover, N.J.

Filed Jun. 5, 1985, Ser. No. 741,740

Int. Cl.[4] H04J 3/06; H04L 7/00

U.S. Cl. 370—102 **16 Claims**

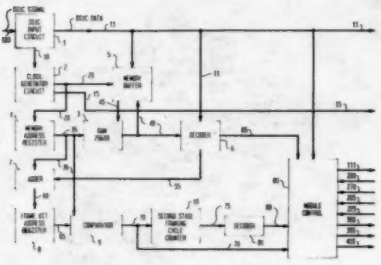
1. Apparatus for determining the relative location of framing bits in an incoming digital signal, which framing bits recur at intervals of I bits and form a first recurring predetermined bit sequence, which apparatus comprises:

means for generating a clock signal in response to the incoming digital signal, the clock signal having pulses corresponding to bits in the incoming digital signal;

a storage device having I storage locations, each of which locations can store L bits;

addressing means for addressing consecutive locations in the storage device in response to pulses of the clock signal, the consecutive storage locations wrapping around to the first after the Ith storage location has been reached;

storing means, responsive to the output of the addressing means, the clock signal and the incoming digital signal, for (a) addressing a location in the storage device, (b) retrieving the bits stored therein, (c) discarding the bit stored therein for the longest period of time, (d) forming a result



with the remaining L-1 bits and a bit from the incoming digital signal, and storing th result in the addressed location; and

examination means for examining the result for equivalence with an L bit code which represents a portion of the pre-determined sequence and for providing a signal when equivalence is found, whereby the storage location at which bits from the pre-determined bit sequence are stored and thereby the relative location of framing bits forming the sequence is determined.

4,688,216

STATION RELIEF ARRANGEMENT FOR USE IN RELIEVING OPERATION OF A REFERENCE STATION IN A TDMA NETWORK WITHOUT REDUCTION OF FRAME AVAILABILITY

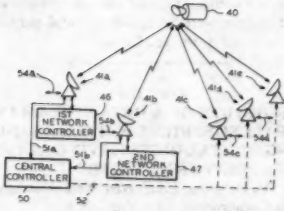
Akio Saburi, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed May 9, 1985, Ser. No. 732,420

Claims priority, application Japan, May 10, 1984, 59-93683; May 10, 1984, 59-93684; May 10, 1984, 59-93685

Int. Cl.[4] H04J 3/06

U.S. Cl. 370—104 **14 Claims**



1. A reference station relief arrangement for use in a predetermined one of a plurality of earth stations of a time division multiple access satellite communication network, each of said earth stations sending an up-link and receiving a down-link signal, each of said up-link and said down-link signals being divisible into a succession of multiframes which have a multiframe period and each of which is divisible into a particular frame and at least one remaining frame, said particular and said remaining frames having a common frame period, a preselected one of said earth stations being used as a primary reference station for producing first reference bursts at a first predetermined time instant in said particular frame and second reference bursts at second predetermined time instants which correspond to said first predetermined time instant in each remaining frame, said second reference bursts being discriminated from said first reference bursts by said earth stations, said first and said second reference bursts defining said multiframe and said particular and said remaining frames in the up-link signal sent by said primary reference station, each of said earth stations establishing and maintaining frame synchronization with reference to the first and the second reference bursts included in said down-link signal, placing a succession of synchronization bursts at a preassigned position at said multiframe period in the up-link signal sent thereby, and performing burst synchronization by detecting said synchronization bursts with reference to said first and said second reference bursts in the down-link signal received thereby;

wherein the improvement is such that said predetermined one of earth stations is used as a subsidiary reference station can relieve the operation of said primary reference station when said primary reference station becomes faulty, said improvement comprising:

first means for producing at said multiframe period a particular one of said synchronization bursts that is specific to said subsidiary reference station and can be identified from the other synchronization bursts by said earth stations; and

second means coupled to said first means for placing said particular one of the synchronization bursts at a third predetermined time instant within said particular synchronization burst in the up-link signal sent thereby while said first and said second reference bursts disappear in the down-link signal received thereby, said particular synchronization burst being kept during disappearance of said first and said second reference bursts to relieve said primary reference station.

4,688,217

METHOD OF IMPLEMENTING BURST ACQUISITION CONTROL IN TDMA SYSTEM

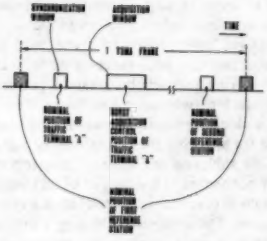
Yuuhei Ishi, and Hideki Nakamura, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Aug. 28, 1985, Ser. No. 770,639

Claims priority, application Japan, Aug. 31, 1984, 59-182339; Aug. 31, 1984, 59-182340

Int. Cl.[4] H04J 3/06

U.S. Cl. 370—104 **4 Claims**



1. A method of implementing burst acquisition control of reference stations over at least one traffic terminal in the Time Division Multiple Access system, comprising the steps of:

(a) allowing the reference station to open a synchronization window at the nominal position of the traffic terminal;

(b) checking to determine if a burst transmitted from the traffic terminal is detected within said synchronization window;

(c) omitting the burst acquisition control if the burst is detected within said synchronization window; and

(d) implementing the burst acquisition control in the event

that the burst is not detected within said synchronization window.

4,688,218

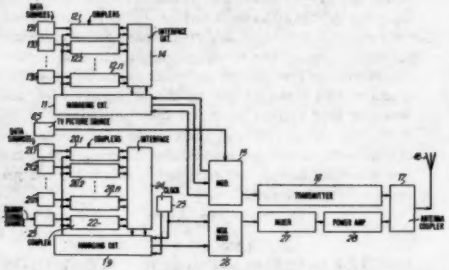
MULTIPLEX CHANNELS FOR CONTINUOUS FLOW FOR NUMERICAL SIGNAL

Joseph Blinesu, Rennes; Daniel Pommier, Mordelles, and Claude Thomas, Chasne sur Illet, all of France, assignors to Etablissement Public de Diffusion Dit "Telediffusion de France" , France

Continuation of Ser. No. 283,502, Jul. 15, 1981, abandoned. This application Jan. 16, 1984, Ser. No. 570,447

Int. Cl.[4] H04J *3/06*

U.S. Cl. 370—106 **9 Claims**



1. A system for transmitting digital data packs comprising transmitter means for periodically transmitting blocks of data during successive periods, each block including a plurality of data packs, each of the periods for transmitting said blocks of data containing a predetermined number of clock pulses which define a period which is at least as long as a block of data, means for filling each of said periods for transmitting said blocks of data with dummy packs if said period is not otherwise filled with said digital packs, means for indicating the beginning of each of said transmission blocks of data by a distinctive synchronization pattern of pulses including a bit synchronization pulse followed by a byte synchronization pulse, at least one data pack receiver means including memory means for storing the synchronization pattern; shift register means for storing two successive bytes; demodulator means including a clock means for demodulating said block of data signals and for applying the demodulating signals to the signal input of said shift register means; comparator means having first inputs connected to the output of said memory means and second inputs connected in parallel to the output of said shift register means; OR gate means having a first input connected to an output of said comparator means; first and second counter means; said first counter means having a capacity of one less than said predetermined number of bits, having a clock pulse input which is connected to the demodulator clock means, and having an overflow output connected to a second input of said OR gate means and to an initialization input of said second counter means; said second counter means having a capacity of two bytes having a clock pulse input connected from a comparator means enable input; the utput of the OR gate means being connected to an initialization input of the first counter means, and the output of the second counter means delivering a validation signal for the transmission block of data.

4,688,219

SEMICONDUCTOR MEMORY DEVICE HAVING REDUNDANT MEMORY AND PARITY CAPABILITIES

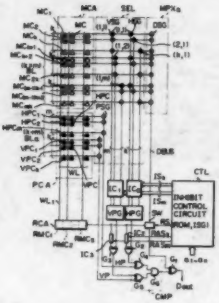
Yoshihiro Takemae, Tokyo, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Aug. 15, 1985, Ser. No. 765,817

Claims priority, application Japan, Aug. 17, 1984, 59-171317

Int. Cl.[4] G06F *11/00;* **H03M** *13/00;* **G11C** *7/00, 29/00*

U.S. Cl. 371—10 **14 Claims**



14. A semiconductor memory device comprising:

a memory cell array including memory cells for storing read data, the read data containing error data;

a parity cell array, operatively connected to said memory cell array, for storing a correct vertical parity and a correct horizontal parity;

a redundant cell array, operatively connected to said parity cell array, including redundant memory cells for replacing a defective one of said memory cells in said memory cell array;

inhibit circuits, operatively connected to said redundant cell array, for inhibiting the error data from being output;

a vertical parity generator, operatively connected to said inhibit circuits, for generating vertical parity signals of the read data;

a horizontal parity generator, operatively connected to said inhibit circuits, for generating horizontal parity signals of the read data;

an inhibit control circuit, operatively connected to said inhibit circuits, for controlling said inhibit circuits and for providing a redundant switching signal; and

a comparator, operatively connected to said vertical parity generator, said horizontal parity generator and said parity cell array, for comparing said redundant switching signal with said correct vertical and horizontal parities so as to correct the error in the read data.

4,688,220

DISTRIBUTION OF A DATA STREAM IN A SERIES-PARALLEL-SERIES DIGITAL ARRANGEMENT COMPRISING DIGITAL UNITS HAVING AT LEAST ONE DEFECTIVE ELEMENT

Marcellinus J. M. Pelgrom, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 15, 1985, Ser. No. 734,379

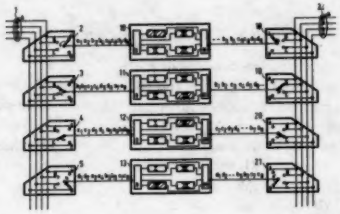
Claims priority, application Netherlands, May 16, 1984, 8401569

Int. Cl.[4] G11C *11/40*

U.S. Cl. 371—10 **7 Claims**

1. A series-parallel-series digital arrangement with at least a storage function, comprising a first number of n ($n>1$) series-parallel-series digital units, each digital unit comprising a second number of k ($k>1$) parallel connected elements at least one of which is defective and at least z ($1 \leqq z < k$) of which is non-defective, for each digital unit there is provided a data

traffic control device having a serial connection port connected to a serial input and a serial output of said digital unit to which it is assigned, each of said data traffic control devices having p (p>1, p≧z) parallel connection points for connection to a respective channel of a bus which comprises at least p channels for a bit serial transport of a data stream via each channel, each data traffic control device redistributing said data stream originating from said bus by a successively fetching, within a given period, a number of bits from each of said p channels and for conducting, in cooperation with its assigned



digital unit, the bits originating from z different channels through said z non-defective elements and the bits originating from the remaining (p-z) channels through said defective elements of its assigned digital unit, each data traffic control device recognizing in the serial data stream supplied on said serial output of its assigned digital unit the bits originating from respective channels and for supplying at its respective parallel connection points bits originating from a respective channel, the same z channels being selected for all digital units of the arrangement.

4,688,221

ERROR RECOVERY METHOD AND APPARATUS

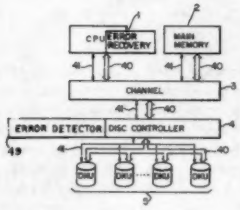
Katsunori Nakamura; Akira Kurano; Yoshiro Shiroyanagi, and Shigeru Kishiro, all of Odawara, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 19, 1984, Ser. No. 683,612

Claims priority, application Japan, Dec. 28, 1983, 58-250377

Int. Cl.[4] G06F *11/14*; G11C *29/00*

U.S. Cl. 371—13 **14 Claims**



1. An error recovery apparatus in a data processing system comprising:

a peripheral unit for storing data in a plurality of data blocks, each of said data blocks having a unique address;

a memory for storing a first channel command word (CCW) chain, said memory having storage areas for storing data transferred from said peripheral unit;

a controller connected between said memory and said peripheral unit for reading said data blocks from said peripheral unit and transferring said data blocks to said memory to store said data blocks in said storage areas determined by said first CCW chain, said controller having detecting means to detect an uncorrectable error in the transfer of the second or subsequent data block of said plurality of data blocks, and;

processing means connected to said controller for generating a new CCW chain when an uncorrectable error occurs in a second or subsequent data block of said plurality of data blocks.

4,688,222

BUILT-IN PARALLEL TESTING CIRCUIT FOR USE IN A PROCESSOR

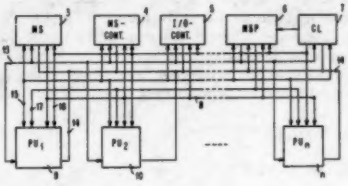
Arnold Blum, Gechingen, Fed. Rep. of Germany, assignor to International Business Machines Corp., Armonk, N.Y.

Filed Dec. 17, 1985, Ser. No. 810,105

Claims priority, application European Pat. Off., Jan. 4, 1985, 85001083.6

Int. Cl.[4] G01R *31/28*

U.S. Cl. 371—25 **13 Claims**



1. A circuit for error testing and diagnosing a plurality of logic subsystems of a processor by means of stored test data, the circuit comprising:

(a) a parallel communications bus operatively connected to a plurality of logic subsystems in a processor;

(b) a signature generator circuit operatively connected to said parallel communications bus for developing a pattern sequence of bits for application to said logic subsystems, said signal generator circuit comprising:

(i) test data storing means;

(ii) clock signal generating means operatively connected to said test data storing means;

(iii) test accumulator means for storing test results provided by said parallel communications bus;

(iv) comparator means operatively connected to said test accumulator means and to said test data storing means;

(v) error indicator means operatively connected to said comparator means for indicating a mismatch between the data from said test accumulator means and the test data; and

(c) storage element means operatively connected to said parallel communications bus and interconnecting said logic subsystems to one another so that all subsystems operatively connected to said parallel communications bus can be tested in parallel with one another by said signature generator circuit.

4,688,223

WEIGHTED RANDOM PATTERN TESTING APPARATUS AND METHOD

Franco Motika, and John A. Waicukauski, both of Hopewell Junction, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 24, 1985, Ser. No. 748,289

Int. Cl.[4] G01R *31/28*

U.S. Cl. 371—27 **3 Claims**

1. In a method of testing a complex integrated circuit structure having substantially more internally interconnected logic devices and bistable devices than the number of input and output terminals to the structure, which construction renders the logic devices inaccessible for discrete testing, a method for determining the relative frequency of occurrence of binary

ones and zeros to be applied as test stimuli to the input terminals of the structure comprising the steps of:

(1) tracing and recording all possible circuit paths backwards from each of said output terminals, or bistable device operationally connected to an output terminal, to an input terminal or bistable device operationally connected to an input terminal;

(2) partitioning each of said paths into successive connected segments, each of which consists of a pair of logic devices wherein each pair consists of a logic device from the next preceding pair and a logic device from the next succeeding pair;

(3) identifying the first logic device in each pair in the direction of backward trace as an X device and the second one as a Y device;

(4) counting and recording the number of device inputs (NDI) for each logic device, wherein NDI equals the summation of input terminals and bistable device outputs directly or indirectly connected through intervening logic devices to the inputs of the given logic device;

(5) counting and recording the number of inputs (N) to each logic device, wherein the number of inputs equals the number of lines connected as inputs to the device;

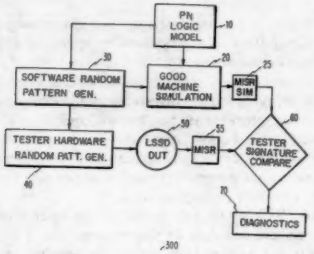
(6) identifying and recording which one of the following logical functions is performed by each logic device

(a) AND

(b) AND/INVERT

(c) OR

(d) OR/INVERT;



(7) computing for each input of the logic devices in the structure the probability (P_{min}) of placing the non-controlling value onto each input of each logic device where

$$P_{min}=3\text{-}N\text{-}(N^2\text{-}2\text{-}2N+5)^{\frac{1}{2}}/(2-2N);$$

(8) setting the zero and one weights for all logic blocks to an initial value of one:

(9) starting with the segment nearest the output of the structure and proceeding backwards toward the input, computing and recording the zero weight (WO) and one weight (W1) for each successive segment in each of the possible circuit paths in accordance with the following relationships:

(a) If device x is an AND

$$W0'_y=\text{MAX}\ (W0_x \text{ or } W0_y)$$

$$W1'_y=\text{MAX}\ (K W1_x \text{ or } W1_y)$$

(b) if device x is an AND/INVERT

$$W0'_y=\text{MAX}\ (W1_x \text{ or } W0_y)$$

$$W1'_y=\text{MAX}\ (K W0_x \text{ or } W1_y)$$

(c) if device x is an OR

$$W0_7=\text{MAX}\ (K W0_x \text{ or } W0_y)$$

$$W1'_y=\text{MAX}\ (W1_x \text{ or } W1_y)$$

(d) if device x is an OR/INVERT

$$W0''_y=\text{MAX}\ (K W1_x \text{ or } W0_y)$$

$$W1'_y=\text{MAX}\ (WO_x \text{ or } W1_y)$$

wherein the value of W0 and W1 inititally set at one are successively altered as the computation proceeds from segment to segment, and

$$K=((NDI_x/NDI_y)+R_{min}(N_x))/2$$

is computed for each segment pair;

(10) stopping the computing and recording of step 9 when the circuit path reaches an input terminal of a bistable device;

(11) for each input terminal, determine the weight value WV in accordance with the following:

(a) if $W0'_y=W1'_yWV=0$

(b) if $W0''_y=W1'_yWV=1$

(12) determine the weighting factor (WF) by dividing the larger of W0 or W1 by the smaller thereof, which weighting factor is the ratio of binary values to be applied to a terminal in a succession of applied input test stimuli.

4,688,224

METHOD OF AND DEVICE FOR CORRECTING BURST ERRORS ON LOW BIT-RATE CODED SPEECH SIGNALS TRANSMITTED ON RADIO-COMMUNICATION CHANNELS

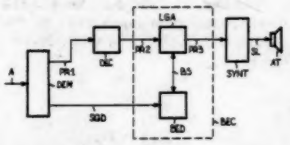
Neviano Dal Degan, S. Mauro Torinese, and Fulvio Rusinà, Cirié, both of Italy, assignors to CSELT - Centro Studi e Laboratori Telecomunicazioni SpA, Turin, Italy

Filed Aug. 16, 1985, Ser. No. 766,754

Claims priority, application Italy, Oct. 30, 1984, 68078 A/84

Int. Cl.[4] G06F *11/00*; G10L *1/00*

U.S. Cl. 371—31 **14 Claims**



1. Method of correcting burst errors on a low-bit-rate coded speech signal transmitted on radio-communication channels, said speech signal being subdivided into intervals, wherein said intervals being indicated by indices n+2, n+1, n, and n−1 and coded into sets of parameters, said errors causing a change in values of said parameters, comprising the steps of:

calculating at each of said intervals, a first distance value of distance between said parameters of intervals n and n−1; comprising said first distance value with a threshold value;

calculating at each of said intervals, a second distance value of distance between said parameters of intervals n+1 and n+2 if said first distance value exceeds said threshold value and if said signal has a bad quality in interval n;

replacing said parameters received in interval n by first locally computed values if said second distance value is lower than said threshold value, or if said second distance value is greater than said threshold value and said signal has a good quality in interval n+1;

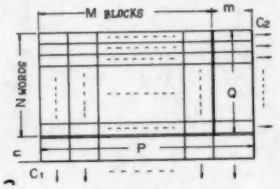
replacing said parameters received in intervals n and n+1 by second locally computed values if said second distance value is greater than said threshold value and said signal has a bad quality in interval n+1.

4,688,225

METHOD FOR UNIFORMLY ENCODING DATA OCCURRING WITH DIFFERENT WORD LENGTHS

Tadashi Fukami, and Kentaro Odaka, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 611,748, May 18, 1984, abandoned.
This application May 20, 1986, Ser. No. 867,893
Claims priority, application Japan, May 21, 1983, 58-89589
Int. Cl.[4] G06F *11/10*
U.S. Cl. 371—37 8 Claims



1. A method of uniformly encoding a digital information signal occurring in groups of symbols, where all symbols within each group have a same length equal to one of n predetermined symbol lengths, said method operating on each group to generate error correction codes therefor independent of the length of the symbols therein, said method comprising the steps of:

forming the symbols in one group into an array consisting of a first plurality of blocks each including a second plurality of said symbols, said array having at least first and second directions of adjacent symbols defined therein;

defining first and second encoding processes of generating error codes operative on selected combinations of symbols occurring successively along said first and second directions, respectively;

selecting a unit length of encoding for said first encoding process equal to an integer times a least common multiple of said n predetermined lengths;

defining successive units of said symbols along said first direction by allocating successive third pluralities of said symbols to said units such that the sum of the lengths of the symbols within each unit equals said unit length; and

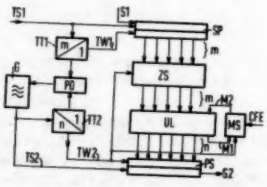
generating error codes in accordance with said first encoding process operating on said units.

4,688,226

CODE ERROR OVERLAYING IN DIGITAL TRANSMISSION SIGNALS

Juergen Burgmeier, Munich, and Josef Doemer, Hohenschaeftlarn, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed May 6, 1985, Ser. No. 730,449
Claims priority, application Fed. Rep. of Germany, May 8, 1984, 3416953
Int. Cl.[4] G06F *11/00*
U.S. Cl. 371—57 11 Claims



1. A method for overlaying code errors into digital transmission signals which are converted into a redundant alphabet code with a plurality of modes before transmission over a digital path, comprising the steps of:

receiving digital transmission signals in a first code;

deriving a first bit clock and a first word clock from the received signals;

performing a series-to-parallel conversion of the received signals;

inputting the received signals word-by-word as parallel digital signals into an intermediate memory by use of the first word clock;

generating a second bit clock and a second word clock;

reading out word-by-word parallel digital signals from the intermediate memory to a recoding code conversion logic by use of the second word clock;

inputting externally generated control pulses into a mode memory connected to the code conversion logic and for initiating code error overlaying with the code conversion logic;

outputting a signal corresponding to a mode condition from the mode memory to the recoding code conversion logic;

reading out word-by-word recoded digital signals from the recoding code conversion logic by use of the second word clock given simultaneous identification of a running digital sum of the recoded digital signals;

outputting a signal corresponding to sequential mode from the recoding code conversion logic to the mode memory;

converting the recoded digital signals from parallel-to-serial form; and

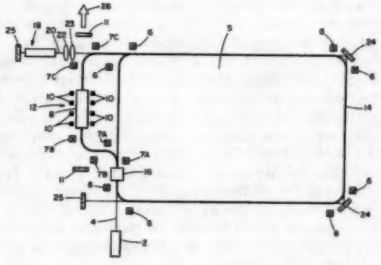
outputting the recoded digital signals bit-by-bit by use of the second bit clock.

4,688,227

LASER COOLING OF ELECTRON BEAM AND FREE ELECTRON LASER USING LASER COOLING

Vincent S. Chan, Del Mar; Shiu-Chu Chiu, San Diego, and Tihiro Ohkawa, La Jolla, all of Calif., assignors to GA Technologies Inc., San Diego, Calif.

Filed Sep. 16, 1985, Ser. No. 776,395
Int. Cl.[4] H01S *3/00*
U.S. Cl. 372—2 8 Claims



1. A free electron laser system with laser cooling comprising:

means for producing a beam of electrons having narrow energy spectrum in a range above 10 MeV;

electron beam transport means for circulating said electron beam in a recirculation loop;

wiggler means disposed along the path of said electron beam for extracting energy from said electron beam in the form of electromagnetic radiation;

an optical resonance cavity producing an output laser beam from said electromagnetic radiation;

means for accelerating said electrons in said electron beam disposed along the path of said electron beam in order to replace energy lost in said wiggler means;

laser means for generating an input laser beam with a radiation intensity in excess of 1×10^7 V/cm; and

laser beam transport means for directing said input laser beam back and forth along a portion of the electron beam recirculation loop so as to produce Compton scattering interactions between some of the input laser radiation and some of said electron beam electrons, said Compton scattering interactions reducing the spread of the energy spectrum of said electron beam caused by action of said wiggler means by preferentially speeding up slower electrons and preferentially slowing down faster electrons to produce laser cooling.

4,688,228

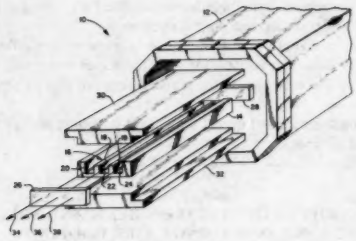
PHASE LOCKED DIELECTRIC RIDGE GAS LASER

Leon A. Newman, South Windsor, and Anthony J. DeMaria, West Hartford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Aug. 6, 1985, Ser. No. 762,899

Int. Cl.[4] H01S *3/098, 3/03*

U.S. Cl. 372—18 **19 Claims**



1. A phase locked ridge waveguide gas laser contained within a housing, comprising:

ceramic body means having a cavity with a length, width and depth formed therein;

gas lasing means contained within said cavity;

excitation means disposed on said ceramic body means for providing radio frequency excitation of said gas lasing means producing an electrical discharge therein;

mirror means positioned relative to said housing means so as to provide lasing of said electrical discharge; and

ridge means located with said cavity, extending along said length and forming therein a plurality of laser resonators providing a guided mode optical signal in each of said resonators, said ridge means further providing less than total separation between said resonators, thereby forming a gap extending over at least a portion of said length and providing a direct path in said gas lasing means between said plurality of laser resonator, for phase locking said guided mode optical signals; and

said excitation means includes an electrode extending over said ridge means, whereby said radio frequency excitation extends into said gap.

4,688,229

GAS LASER STRUCTURE, PARTICULARLY CO_2 LASER

Hans Opower, Krailling, Fed. Rep. of Germany, assignor to W.C. Heraeus GmbH, Hanau, Fed. Rep. of Germany

Filed Jul. 29, 1985, Ser. No. 760,166

Claims priority, application Fed. Rep. of Germany, Sep. 19, 1984, 3434373

Int. Cl.[4] H01S *3/097*

U.S. Cl. 372—87 **20 Claims**

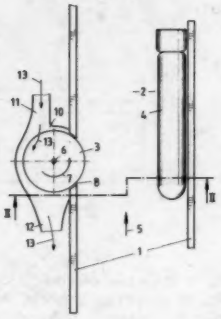
1. Gas laser structure, particularly CO_2 laser, having

means (1) for defining a discharge space (2) through which a laser-active gas is being passed at high speed in a predetermined flow direction,

a cathode electrode (3) and an anode electrode (4) located in the discharge space and spaced from each other, for stimulating said laser-activated gas flowing in said direction in said discharge space by uniirectional discharge between said electrodes, across the direction of flow of the gas,

wherein the cathode electrode (3) comprises

a rotation-symmetrical body rotating about an axis positioned with respect to the circumferential surface of said



rotation-symmetrical body such that the geometric form of the surface facing the anode electrode (4) does not change;

and means (25, 26) for rotating said cthode electrode at a speed such that the surface speed of the cathode in the direction of flow of the gas to be stimulated in said discharge space, is at least approximately equal to the speed of the gas flowing in the discharge space.

4,688,230

CONSTRUCTION LASER, IN PARTICULAR CANAL CONSTRUCTION LASER

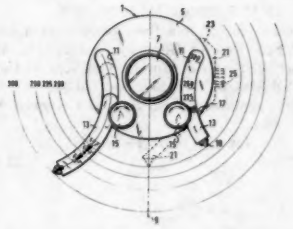
Ronald Knittel, Gross-Umstadt, Fed. Rep. of Germany, assignor to AGL Bau-Laser Gerate Vertriebs GmbH, Fed. Rep. of Germany

Filed Feb. 5, 1986, Ser. No. 826,294

Claims priority, application Fed. Rep. of Germany, Feb. 15, 1985, 3504239[U]; Apr. 19, 1985, 3511685

Int. Cl.[4] H01S *3/02;* **G01C** *3/00*

U.S. Cl. 372—109 **7 Claims**



1. A construction laser with a water-tight housing (1) having a vertical plane of longitudinal symmetry (9) and consisting of preferentially tubular housing central section (3) and face-side end sections (5) and at least one adjusting means comprising three adjustment feet (13, 23), wherewith two first ones of said adjustment feet (13) lie closer to one end section and at least a second one of said adjustment feet (13, 23), offset in the axial direction therefrom, lies closer to the opposite-lying end section of the housing (1), with the two first adjustment feet (13) positioned transversely from the vertical plane of longitudinal

symmetry, opposed to one another and held in inwardly and outwardly displaceable and lockable fashion in associated guide slots (11) formed in said housing on opposite sides of the vertical plane of longitudinal symmetry, characterized by the fact that: the housing central section (3) consists of a non-cast formed body; each of the associated guide slots (11) is arcuate, with its convex section of arc facing the vertical plane of longitudinal symmetry; and each of the first adjustment feet (13) has an arcuate shape corresponding to the arcuate shape of its associated guide slot whereby each first adjustment foot is held in displaceable fasion in and along its associated one of the guide slots.

4,688,231

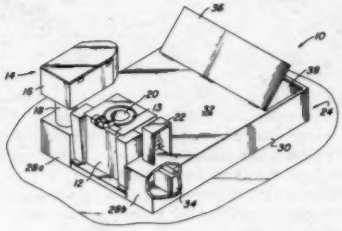
INDUCTION FURNACE PACKAGING SYSTEM

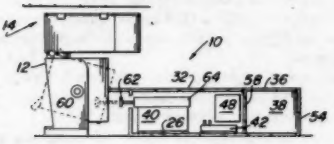
John H. Mortimer, Medford, N.J., assignor to Inductotherm Corp., Rancocas, N.J.

Continuation-in-part of Ser. No. 761,272, Aug. 1, 1985, Pat. No. 4,639,931. This application Sep. 25, 1986, Ser. No. 911,599

Int. Cl.⁴ H05B *5/00*

U.S. Cl. 373—138 **3 Claims**





1. A packaging system for an induction furnace comprising:
(a) housing means having a base, side walls and a top wall, the base, top and side walls defining an enclosed space,
(b) an induction furnace contained substantially within the enclosed space, the induction furnace having a removable liner,
(c) means for tilting the furnace about an axis perpendicular to the furnace axis located within the enclosed space,
(d) furnace operating equipment centrally located within the enclosed space and defining a space between the furnace operating equipment and a side wall of the housing means, said furnace operating equipment including means operatively associated with the furnace for at least partially ejecting the removable liner from the furnace,
(e) access means in the top wall adjacent the space between the furnace operating equipment and the side wall for providing access to the space and access to the furnace operating equipment from the side thereof while preventing access to the furnace operating equipment from the top thereof,
(f) induction furnace charging means mounted on the housing means adjacent the induction furnace and pivotable with respect thereto for charging the induction furnace with metal to be melted, and
(g) furnace control housing means mounted on the top wall and adjacent the induction furnace.

4,688,232

DECODER FOR MANCHESTER ENCODED DATA

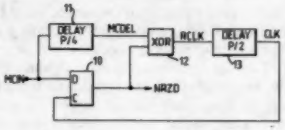
Trevor R. Fox, Warrington, Great Britain, assignor to International Computers Limited, London, England

Filed Jan. 29, 1986, Ser. No. 823,654

Claims priority, application United Kingdom, Mar. 8, 1985, 8506100

Int. Cl.⁴ H04L *27/22*

U.S. Cl. 375—87 **8 Claims**



1. A decoder for Manchester encoded data, comprising:
(a) means for sampling the encoded data at a predetermined point in each cycle of clock signal, to produce a decoded data signal,
(b) first delay means for delaying the encoded data signal by one-quarter of a period of an expected clock frequency of the encoded data, to produce a delayed encoded data signal,
(c) an exclusive-OR gate having a first input connected to receive the delayed encoded data signal, a second signal input connected to receive the decoded data signal, and an output which provides a control signal, and
(d) second delay means for delaying said control signal by one-half of a period of said expected clock frequency, to produce said clock signal.

4,688,233

DIGITAL DATA TRANSMITTING DEVICE FOR COMMUNICATION PATHS OF RESTRICTED AND UNRESTRICTED TRANSMISSION CHARACTERISTICS

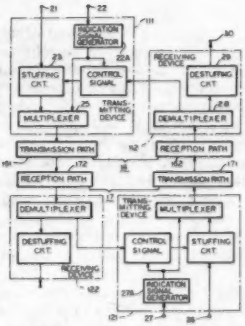
Mitsuo Nishiwaki; Tooru Amano; Tooru Yasuda, all of Tokyo; Sakae Okubo, and Naoki Mukawa, both of Kanagawa, all of Japan, assignors to NEC Corporation, Japan

Filed Nov. 7, 1985, Ser. No. 796,094

Claims priority, application Japan, Nov. 10, 1984, 59-235948; Nov. 10, 1984, 59-235949

Int. Cl.⁴ H04L *7/00*

U.S. Cl. 375—58 **9 Claims**



1. A digital data transmitting device for use as a first digital data transmitting device together with a first digital data receiving device in a digital data communication network comprising second digital data transmitting and receiving devices

and first and second digital communication paths connected to said first digital data transmitting and receiving devices and to said second digital data transmitting and receiving devices, respectively, said first digital data transmitting device including stuffing means responsive to a first bit sequence of digital data for carrying out stuffing to said first bit sequence for transmission to said first digital communication path, said second digital data transmitting device being capable of carrying out stuffing to a second bit sequence of digital data for transmission to said second digital communication path, wherein the improvement comprises:

first indication signal generating means included in said first digital data transmitting device for generating a first indication signal indicative of a necessity and an unnecessity of the stuffing for said first digital communication path;

second indication signal generating means included in said second digital data transmitting device for generating a second indication signal indicative of a necessity and an unnecessity of the stuffing for said second digital communication path; and

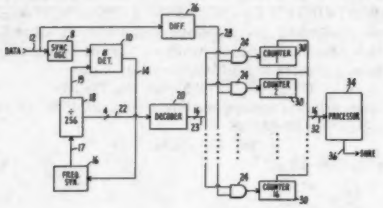
control means included in said first digital data transmitting device for controlling said stuffing means to make the stuffing means carry out the stuffing when at least one of said first indication signal and said second indication signal sent from the second digital transmitting device indicates a necessity of the stuffing and not to make the stuffing means carry out the stuffing when said first and second indication signals indicate an unnecessity of the stuffing.

4,688,234

APPARATUS AND METHOD FOR PRODUCING A SIGNAL-TO-NOISE RATIO FIGURE OF MERIT FOR DIGITALLY ENCODED-DATA

Michael A. Robinton, Palo Alto, Calif., assignor to Robinton Products, Inc., Sunnyvale, Calif.

Filed Jun. 21, 1985, Ser. No. 747,730
Int. Cl.[4] H04B *3/46*
U.S. Cl. 375—10 **28 Claims**



1. Apparatus for producing an estimated signal-to-noise ratio figure of merit value for a received digitally-encoded binary data sequence wherein the data sequence originates from a source which transmits the data at a baseband data rate, with logic states of the data at the source being changeable at predetermined periodic epoch times, said apparatus comprising:

receiving means for receiving the received data;

transition means coupled to said receiving means for producing transition signals indicative of the times in which transitions occur in the received data during the sequence;

reference means for producing reference signals substantially phase coherent with respect to said predetermined epoch time points at the source of the transmitted data sequence;

deviation means responsive to said transition signals and said reference signals for producing a plurality of sets of deviation data representing the time difference between said transition in the received data and said epoch time points, with said deviation data in respective ones of said sets indicating the number of said transitions which occurred within respective ones of a plurality of consecutive time intervals; and

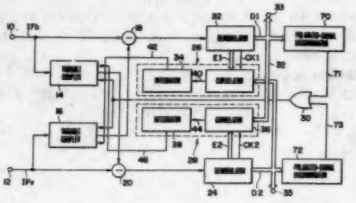
processor means for characterizing said sets of deviation data and producing said figure of merit value indicative of the approximate signal-to-noise ratio of the received data sequence in accordance with said characterization.

4,688,235

CROSS-POLARIZATION INTERFERENCE CANCELLER

Masato Tahara; Tooru Matsuura, and Toshihiko Ryu, all of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Nov. 27, 1985, Ser. No. 803,132
Claims priority, application Japan, Nov. 30, 1984, 59-252893; May 29, 1985, 60-115735; May 29, 1985, 60-115736
Int. Cl.[4] H04B *1/10*
U.S. Cl. 375—102 **11 Claims**



1. A cross-polarization interference canceller for use in a digital radio communications receiver, comprising:

first and second variable couplers (**14**), (**16**) for receiving respectively first and second IF signals which are orthogonally polarized with respect to each other;

a first subtracter (**18**) to which said first IF signal and the output of said second variable coupler are applied;

a second subtracter (**20**) to which said second IF signal and the output of said first variable coupler are applied;

a first demodulator (**22**) demodulating the output of said first subtracter, and producing first error and data signals;

a second demodulator (**24**) demodulating the output of said second subtracter, and producing second error and data signals;

a first control signal generator (**26**) receiving said first error signal and said second data signal to correlate same, and controlling said second variable coupler;

a second control signal generator (**28**) receiving said second error signal and said first data signal to correlate same, and controlling said first variable coupler;

a first polarized-signal discriminator (**70**) for determining if said first demodulator demodulates said first data signal, and for resetting at least said first variable coupler in the event that said first polarized-signal discriminator fails to determine that said first demodulator demodulates said first data signal; and

a second polarized-signal discriminator (**72**) for determining if said second demodulator demodulates said second data signal, and for resetting at least said second variable coupler in the event that said second polarized-signal discriminator fails to determine that said second demodulator demodulates said second data signal.

4,688,236

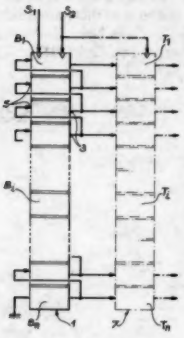
PROCESS FOR THE USE OF A BINARY REGISTER WITH N BISTABLE CELLS MAKING IT POSSIBLE TO DETERMINE THE RATIO OF TWO FREQUENCIES AND APPARATUS FOR PERFORMING THE PROCESS

Marc DuPoy, Paris, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Jun. 24, 1986, Ser. No. 877,847
Claims priority, application France, Jul. 3, 1985, 85 10173
Int. Cl.[4] H03K *21/18, 21/00*
U.S. Cl. 377—48 **11 Claims**

1. A process for the use of a binary register with n intercon-

nected bistable cells, wherein a first pulse signal S_1 of frequency F_1 is supplied to a counting input and a second pulse signal S_2 of frequency F_2 is supplied to a shift input, with $F_1 >> F_2$, the content of the register being permanently incremented by one unit for each pulse of the first signal S_1 and shifted so as to divide by two the content of the register for each pulse of the second signal S_2, the content of said register representing the ratio of the two frequencies.

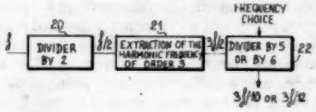


4,688,237

DEVICE FOR GENERATING A FRACTIONAL FREQUENCY OF A REFERENCE FREQUENCY

Roland Brault, Antony, France, assignor to Thomson-CSF, France, France

Filed Nov. 13, 1984, Ser. No. 671,092
Claims priority, application France, Nov. 15, 1983, 83 18134
Int. Cl.⁴ H03K *21/00*
U.S. Cl. 377—48 **24 Claims**



1. Apparatus for generating a plurality of fractional frequencies of a reference signal having a frequency f, comprising:

first divider means, adapted to receive said reference signal, for dividing said reference signal frequency by an integer m, and for providing a divided signal having a frequency f/m;

extraction means, coupled to said divider means, for extracting a harmonic frequency of order n, n being an integer, and for providing a digital output signal having a frequency (nf)/m; and

second divider means, coupled to said extraction means, for dividing said digital output signal by an integer p or an integer q to provide either a first digital signal having a frequency (nf)/(mp), or a second digital signal having a frequency (nf)/(nq).

4,688,238

METHOD FOR DETERMINING LITHOLOGICAL CHARACTERISTICS OF A POROUS MATERIAL

Eve S. Sprunt, Farmers Branch, Tex.; Neil V. Humphreys, Essex, Great Britain; Ernest L. Muegge, Grand Prairie, and James R. Dixon, Jr., Dallas, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed May 30, 1986, Ser. No. 868,487
Int. Cl.⁴ G01N *23/00, 23/04, 15/08*
U.S. Cl. 378—4 **8 Claims**

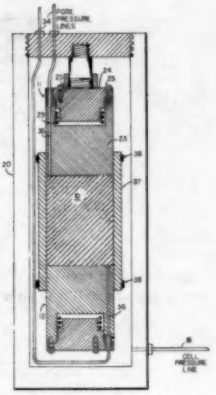
1. A method for determining the range of confining pressures which can be applied to an elastic jacket surrounding a substantially cylindrical sample of a porous material during a measurement of the lithological characteristics of said sample of porous material, comprising the steps of:

(a) placing said sample with its surrounding elastic jacket in a confining pressure cell,

(b) supplying pressure to said cell to press said jacket into contact with said sample,

(c) varying the pressure within said cell over a plurality of pressure points,

(d) scanning said sample with X-rays at a plurality of locations at each of said pressure points,



(e) producing computed tomographic images of said sample for each of said plurality of locations and said pressure points,

(f) determining from said computed tomographic images the conformance of said jacket to the surface of said sample at each of said pressure points, and

(g) determining from said conformance a range of pressures for said confining pressure over which sample parameters may be measured without being affected by improper conformance of said jacket to the surface of said sample.

4,688,239

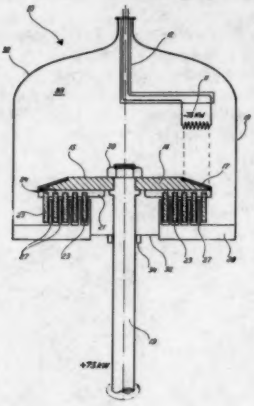
HEAT DISSIPATION MEANS FOR X-RAY GENERATING TUBES

Donald R. Schaffner, Mission Viejo, and Donald H. Leeds, Rolling Hills, both of Calif., assignors to The B. F. Goodrich Company, New York, N.Y.

Filed Sep. 24, 1984, Ser. No. 653,629
Int. Cl.⁴ H01J *35/10*
U.S. Cl. 378—141 **35 Claims**

1. In a device for emitting electromagnetic radiation wherein a polarized cathode and an oppositely polarized target track assembly including a support therefore are sealed within an envelope, the assembly being rotatable from without the envelope and including a means for extracting heat from the assem-

bly and dissipating the heat, the improvement comprising: a plurality of pyrolytic graphite fins affixed to the assembly and



within the envelope and configured to accept heat from the assembly and to transfer the heat to a heat-acceptor.

4,688,240

NON-DESTRUCTIVE TESTING OF FIBER REINFORCED STRUCTURAL MATERIALS

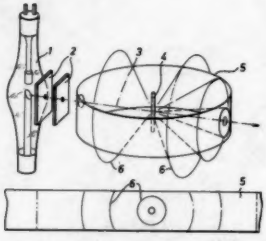
Rolf Hosemann, Berlin; Walter Mayland, Stuhr, and Juergen Walter, Ganderkesee, all of Fed. Rep. of Germany, assignors to Erno Raumfahrttechnik GmbH, Bremen, Fed. Rep. of Germany

Filed Nov. 7, 1984, Ser. No. 669,316

Claims priority, application Fed. Rep. of Germany, Nov. 11, 1983, 3340790; Jul. 3, 1984, 3424384

Int. Cl.[4] G01T *1/36;* **G01N** *23/201, 23/20*

U.S. Cl. 378—70 **15 Claims**



1. Method for non-destructive testing of fiber reinforced structural materials under utilization of x-rays and detection comprising the steps of:

irradiating a sample or sample portion of the compound part with monochromatic x-rays; and

detecting disposition and configuration of diffracted and refracted x-ray patterns on account of interaction with polycrystal material in the interior wherein different patterns result from differences in crystaline structure of the fibers and the host material in order to determine details and particulars of the fibers in said object.

4,688,241

MICROFOCUS X-RAY SYSTEM

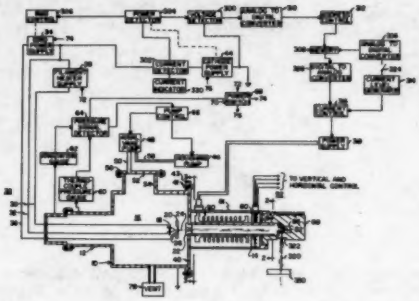
Richard S. Peugeot, Stone Mountain, Ga., assignor to Ridge, Inc., Tucker, Ga.

Filed Mar. 26, 1984, Ser. No. 593,125

The portion of the term of this patent subsequent to Jun. 4, 2002, has been disclaimed.

Int. Cl.[4] H01T *35/30*

U.S. Cl. 378—137 **11 Claims**



1. A microfocus X-ray system comprising:

a vacuum enclosure having first and second openably attachable chambers;

electron beam generation means positioned in said first chamber and comprising a filament-cathode and a grid spaced from said filament-cathode, said grid having an aperture through which an electron beam emitted by said filament-cathode passes in a line, said beam passing from said first chamber into said second chamber;

said second chamber being tubular and extending around said electron beam;

a focusing coil wound around said tubular second chamber;

an anode having an opening therethrough for passage of said electron beam, said anode being positioned intermediately between said grid and said focusing coil;

a metal target positioned at an extreme end of said second chamber which is downstream, in terms of the passage of said beam, and said target being electrically connected to said anode;

beam deflection means positioned proximate to said electron beam and, responsive to electrical signals, for selectively positioning said electron beam onto selected areas of said target;

a window of X-ray permeable material positioned adjacent to said target through which emitted X rays, responsive to bombardment of said target by said electron beam, pass from said second chamber;

first biasing means for applying a heater voltage to said filament-cathode, second biasing means for adjustably applying a negative voltage to said grid with respect to said filament-cathode, and third biasing means for adjustably applying an accelerating voltage to said anode, said accelerating voltage being connected as a ground potential to said anode and as a negative potential on said filament-cathode;

power control means responsive to the electron beam current passing in circuit between said filament-cathode and target for controllably adjusting the voltage of said second biasing means for effecting a grid bias of a value for maintaining a selected value of electron beam power;

focusing control means coupled to said focusing coil and responsive to the voltage of said third biasing means for applying an electrical input to said focusing coil of a level which varies as a function of anode-to-cathode voltage for maintaining an electron spot size within the range of 10 to 100 microns; and

pressure sensing means for providing an electrical output

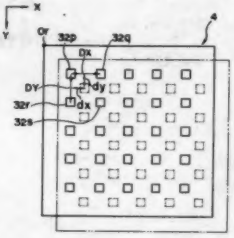
representative of the pressure within said housing, and pumping means responsive to said electrical output for maintaining a vacuum pressure in said enclosure of between 10^{-4} to 10^{-6} Torr.

4,688,242

X-RAY IMAGING SYSTEM

Takehiro Ema, Ootawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 29, 1986, Ser. No. 857,050
Claims priority, application Japan, Apr. 30, 1985, 60-90929
Int. Cl.[4] G21K *1/00*
U.S. Cl. 378—154 **9 Claims**



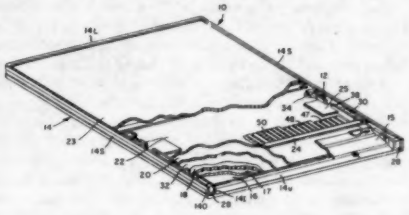
1. An X-ray imaging system comprising:
an X-ray source for emitting X-rays to be radiated on an object;
X-ray image detection means for detecting an X-ray image emitted from said X-ray source and transmitted through said object;
X-ray mask means, having a plurality of X-ray shielding regions distributed in a predetermined pattern, for locally shielding X-rays with said plurality of X-ray shielding regions;
drive means for moving said X-ray mask means so that said X-ray mask means is inserted or removed with respect to an X-ray radiation field between said X-ray image detection means and said X-ray source and is sequentially positioned at a plurality of predetermined positions in said X-ray radiation field;
storage means for storing X-ray image data;
first calculating means, associated with said storage means, for calculating scattered X-ray intensity distribution data associated with said object based on a plurality of transmission X-ray data obtained by irradiating said object with X-rays when said X-ray mask means is located at different positions in said X-ray radiation field, and on transmission X-ray data obtained by irradiating said object with X-rays when said X-ray mask means is located outside said X-ray radiation field;
second calculating means, associated with said storage means, for calculating X-ray image data, from which the influence of scattered X-rays is eliminated, in accordance with the scattered X-ray intensity distribution data obtained by said first calculating means and transmission X-ray data obtained by irradiating said object with X-rays when said X-ray mask means is located outside said X-ray radiation field; and
image output means for outputting the X-ray image data calculated by said second calculating means as a visible image.

4,688,243

DAYLIGHT X-RAY CASSETTE HAVING VARIABLE SIZE LEAF SPRINGS

Charles P. De Felice, Wilmington, Del., and Donald F. Le Roux, Elkton, Md., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 21, 1985, Ser. No. 767,334
Int. Cl.[4] G03B *17/26*
U.S. Cl. 378—187 **5 Claims**



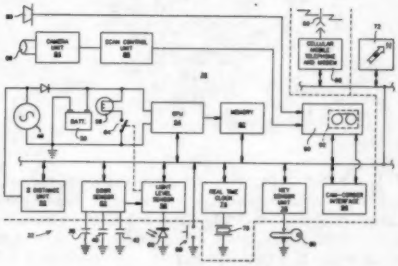
1. In an X-ray cassette of the type having a casing,
a fixed plate and a moveable plate within said casing,
a film-sheet receivable between the plates,
bias means including a cam riding surface for biasing the moveable plate toward the fixed plate by applying a biasing force.
an actuating cam assembly operatively associated with the bias means to engage the cam-riding surface and release the biasing force from the moveable plate when the cam assembly is in a first position and apply the biasing force when the cam assembly is in a second position,
the bias means including at least one pressure applying strap comprising a plurality of leaf spring elements mounted on a supporting arm extending therefrom in a plane.
the strap extending across the moveable plate,
the improvement comprising a plurality of leaf spring elements of variable cross-section and length,
the cross-section and length of the leaf spring elements away from the edges of the moveable plate being respectively larger and longer than the cross-section and length of the leaf spring elements adjacent the edges of the moveable plate.

4,688,244

INTEGRATED CARGO SECURITY SYSTEM

Marwan Hannon, 956 Foothill Dr., and Mark L. Denekamp, 1779 Sweetwood Dr., both of Colma, Calif. 94015

Filed Nov. 10, 1986, Ser. No. 929,391
Int. Cl.[4] H01Q *7/04*
U.S. Cl. 379—58 **16 Claims**



1. An integrated cargo transportation security system for use with a fleet of enclosed cargo transportation containers, each container having at least one access door enabling cargo to be

loaded and unloaded, the system including for at a said container:

door sensor means for sensing and putting out a door status signal when the access door is open and when it is closed,

a module unit associated with the container, each module unit including means for receiving a removable module and including cabling leading to said door sensor means,

a removable module for each module unit lookable mounting into a housing of the unit by security personnel,

a central data collection and processing facility for receiving cargo trip data collected by at least one active module during a cargo trip of a said container of the fleet and for processing the cargo trip data into a roadmap indicating travel route of the said container during the trip and time and location of significant events such as unauthorized opening of the cargo door during the trip,

the said module unit in combination with an active module including a self contained power supply, incremental distance detection means for detecting incremental distance travelled by said container, direction sensing means for sensing the direction of travel of said container, clock means for generating clock signals corresponding to the time interval of the trip, central processing means connected to the door sensor means, the power supply, the incremental distance detection means, the direction sensing means and the clock means for generating a sequence of status numbers indicative of accumulated incremental distance, direction, time and door status, and any tampering with the module unit, and memory means for storing the said sequence during the trip,

the system including means for transferring the sequence stored in the memory means to the central data collection and processing facility.

4,688,245

METHOD AND CIRCUIT ARRANGEMENT FOR COMPENSATING CROSS-TALK AND/OR ECHO SIGNALS

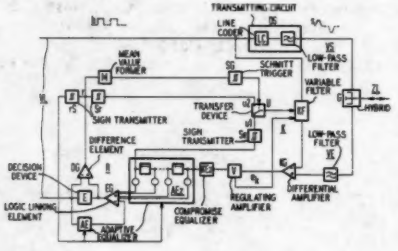
Heinrich Schenk, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Dec. 3, 1984, Ser. No. 677,361

Claims priority, application Fed. Rep. of Germany, Dec. 1, 1983, 3343584; Apr. 17, 1984, 3414534; Apr. 17, 1984, 3414523; Apr. 17, 1984, 3414554

Int. Cl.[4] H04B *3/23*

U.S. Cl. 379—410 **22 Claims**



1. In a method of compensating echo and/or crosstalk signals in a digital communication system of the type having an adaptive compensation circuit arranged between a transmitting arm and a receiving arm of a four-wire line as referenced to and connected to a two-wire line by way of a hybrid circuit, the compensation circuit including a settable variable filter, and a logic-linking element for input coupling a compensation signal from the variable filter to the receiving arm thereby compensating echo and/or crosstalk signals contained in a received signal and forming it into a compensated received signal, the improvement comprising the steps of:

adaptively compensating and equalizing a signal received in the receiving arm;

applying the equalized signal to a decision device as its input signal and forming a setting signal;

setting the variable filter coefficients in accordance with the compensated received signal when the difference between the input and output signals of the decision device is greater than a predetermined amount; and

setting the variable filter coefficients in accordance with the difference between the input and output signals of the decision device when that difference is less than said predetermined amount.

4,688,246

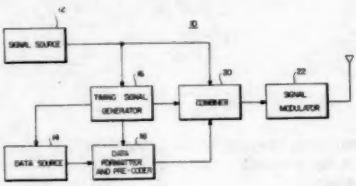
CATV SCRAMBLING SYSTEM WITH COMPRESSED DIGITAL AUDIO IN SYNCHRONIZING SIGNAL INTERVALS

Carl G. Eilers, River Forest; Ronald B. Lee, Chicago, and Rudolf Turner, Vernon Hills, all of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Filed Dec. 20, 1985, Ser. No. 811,928

Int. Cl.[4] H04N *7/167*

U.S. Cl. 380—9 **28 Claims**



1. A signal encoding system comprising:

means for developing a reference signal having regularly spaced zero crossings;

means for developing a data signal having regularly spaced sampling points from a data source; and

means for combining the reference signal and the data signal with phasing such that the sampling points of the data signal coincide with zero crossing points of the reference signal.

4,688,247

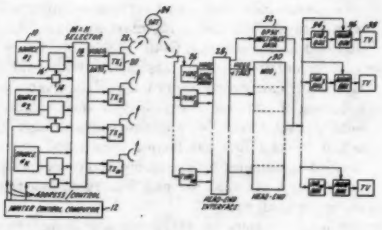
PAY TV SCRAMBLING BY AUDIO ENCRYPTION

Mircho A. Davidov, Danville, Calif., assignor to Oak Industries Inc., Rancho Bernardo, Calif.

Filed Jun. 5, 1986, Ser. No. 870,866

Int. Cl.[4] H04N *7/167*

U.S. Cl. 380—19 **9 Claims**



1. In a subscription TV distribution system, a plurality of sources of TV program channels, each including a video signal

and an encrypted audio signal, with the encrypted audio signal including encrypted control and subscriber address data,

a communications link connecting said plurality of sources with at least one receiving site having means for receiving said plurality of TV channels, means at a receiving site for separating the encrypted audio signal in each channel from the video signal, means at each receiving site for multiplexing the separated encrypted audio signals on a single non-TV channel carrier, means at each receiving site for including an identity tag on each video signal for use in selecting the corresponding audio signal from said plurality of multiplexed audio signals,

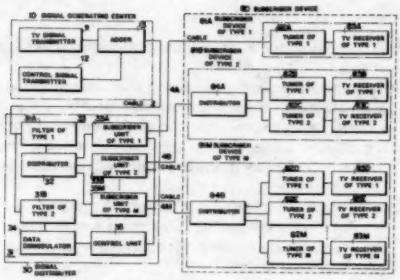
and a plurality of subscribers in communication with said receiving site for receiving one or more of said video signals and said multiplexed audio signals, each subscriber having means for separating the tag from its associated video signal and using the separated tag to select the encrypted audio signal from the multiplexed audio signals which corresponds to the tag and its associated video signal, and means at each subscriber for decrypting the audio signal and its included control and address data.

4,688,248

PAY TELEVISION SYSTEM

Akimori Tomizawa, Tokyo, Japan, assignor to Clarion Co., Ltd., Tokyo, Japan

Filed Mar. 20, 1985, Ser. No. 714,152
Int. Cl.[4] H04N *7/167, 1/00, 7/10;* **H04H** *1/00*
U.S. Cl. 380—20 **3 Claims**



1. A pay television system, comprising:

a signal generating center having television signal transmitter means for producing a television signal which includes a plurality of different channel signals corresponding to respective television channels, control signal transmitter means for producing a control signal which includes subscription information identifying which of said channel signals each of a plurality of subscribers is permitted to receive, and an adder which combines said television signal and said control signal into a combined signal;

a signal distributor, and a first cable which connects said signal generating center to said signal distributor and carries said combined signal from said signal generating center to said signal distributor, said signal distributor having a first filter which separates said television signal from said combined signal, a second filter which separates said control signal from said combined signal, at least one subscriber unit which receives said television signal from said first filter, and at least one control unit which receives said control signal from said second filter; and

a subscriber device, and a second cable connecting said signal distributor to said subscriber device, said subscriber device having first and second tuners which each correspond to a respective subscriber and which can each transmit to said signal distributor across said second cable a respective tuning signal identifying the corresponding subscriber and identifying a television channel selected by the subscriber, said subscriber device further having first and second television receivers coupled to said second cable, respectively tuned to first and second predetermined television channels which are different, and respectively associated with said first and second tuners;

wherein said subscriber unit includes a first converter unit which corresponds to said first tuner and can frequency convert a selected one of said channel signals from said television signal into a first frequency converted signal in a first predetermined frequency band corresponding to said first predetermined television channel, a second converter unit which corresponds to said second tuner and can frequency convert a selected one of said channel signals from said television signal into a second frequency converted signal in a second predetermined frequency band corresponding to said second predetermined television channel, and a third filter which transmits said first and second frequency converted television signals across said second cable to said subscriber device, said first and second frequency converted signals from said second cable being respectively applied to said first and second television receivers; and

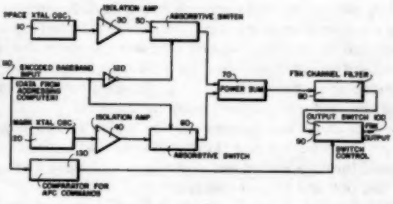
wherein said control unit includes means responsive to receipt of each said tuning signal for checking said subscription information from said control signal in order to determine whether the subscriber identified in each tuning signal is permitted to receive the channel identified in such tuning signal and, when said control unit determines that the identified subscriber is permitted to receive the identified channel, for causing a respective one of said converter units corresponding to the tuner which produced such tuning signal to carry out said frequency conversion using one of said channel signals which corresponds to the channel identified in the tuning signal.

4,688,249

CATV SYSTEM AND METHOD OF CURTAILING RECEPTION OF UNAUTHORIZED SERVICE CHANNELS

John J. Hayes, Chesapeake, Va., and Dennis L. Troutman, Lykens, Pa., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 17, 1986, Ser. No. 819,642
Int. Cl.[4] H04N *7/167*
U.S. Cl. 380—20 **10 Claims**



10. A method of curtailing piracy at subscriber converter locations in a CATV system comprising the steps of:

(a) generating encoded commands including anti-piracy commands (APC);

(b) modulating said commands prior to transmission of a CATV distribution system;

(c) interrupting transmission of modulated commands for a predetermined period of time when an APC command is generated; and

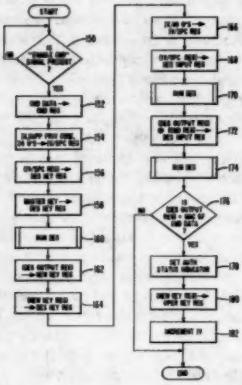
(d) disabling a converter at a subscriber location upon failure to detect an interruption for a predetermined period of time following reception by the converter of an APC command.

4,688,250

APPARATUS AND METHOD FOR EFFECTING A KEY CHANGE VIA A CRYPTOGRAPHICALLY PROTECTED LINK

Donald G. Corrington, Burlington County; Stephen D. Hawkins, and Daniel M. Sable, both of Mercer County, all of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Jan. 29, 1986, Ser. No. 823,537
Int. Cl.[4] H04L 9/02
U.S. Cl. 380—23 17 Claims



1. In a secure communications system wherein a message is transmitted from a first station to a second station, said message including an authenticating codeword which is a unique cryptographic function of said message and a key, said second station including means for authenticating a message received therein, said authenticating means including means for generating a second codeword which is said unique cryptographic function of the message received by said second station and said key, said authenticating means further including means for comparing said authenticating codeword received by said second station with said second codeword, a method at said second station for responding to a message received therein commanding a change of key from a current key to a subsequent key, said method comprising the steps of:

(a) generating said subsequent key which is said cryptographic function of a third codeword and a master key, said third codeword and said master key being known in said first and second stations;

(b) generating a fourth codeword which is said cryptographic function of a fifth codeword and said subsequent key, said fifth codeword being known in said first and second stations;

(c) merging said key change command message with said fourth codeword to produce a sixth codeword;

(d) generating said second codeword which is said cryptographic function of said sixth codeword and said subsequent key;

(e) comparing said second codeword with said authenticating codeword included with said key change command message; and

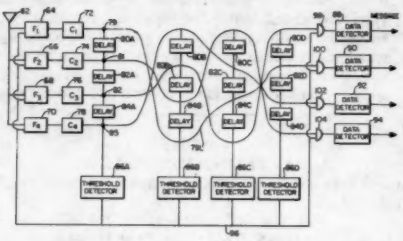
(f) substituting said subsequent key for said current key if the comparison of said comparing step is favorable.

4,688,251

WAVE PACKET COMMUNICATION SUBSYSTEM FOR DETERMINING THE SYNC PULSES AND CORRELATING THE DATA PULSES OF A WAVE PACKET

Irwin M. Citron, Monsey, N.Y., and Philip Kaszerman, West Orange, N.J., assignors to The Singer Company, Stamford, Conn.

Filed Jan. 21, 1986, Ser. No. 820,049
Int. Cl.[4] H04K 1/00
U.S. Cl. 380—34 10 Claims



1. A subsystem for a wave packet communication system, comprising:

an antenna for receiving respective trains of sequential sync and data pulses transmitted from a plurality of sources;

a plurality of receivers connected to the antenna for accepting the sync pulses, each of the sync pulses being directed to a receiver having frequency matching that of the particular sync pulse;

a corresponding number of correlators, the respective inputs of which being connected to the respective outputs of the receivers, for correlating the received sync pulses with predetermined codes;

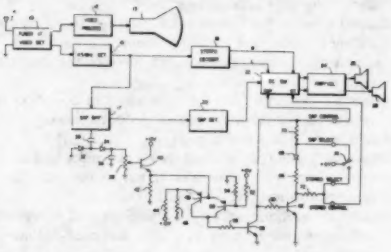
a plurality of parallel cascades each including multiple delay elements corresponding in number to one less than the total number of correlators, the input of each of the delay elements being connected to a corresponding output of any one of the correlators, the parallel cascades adding time delays to the respective sync pulses exiting from the correlators, the time delay for each sync pulse being proportional to the number of delay elements that sync pulse has to travel through, wherein the time delay elements cause the respective sync pulses of only one train of sequential sync pulses to arrive, at a certain instant of time, at the end of a particular cascade, the summed energy of the respective sync pulses of the one train of sequential sync pulses being above a certain energy threshold; and

a plurality of threshold detecting means, corresponding in number to the parallel delay element cascades, having respective inputs connected in a one-to-one relationship with the respective outputs of the last delay elements of the cascades, each input of the threshold detecting means further being connected in a one-to-one relationship with a corresponding output of any one of the correlators, for detecting the energies of respective trains of arrived sync pulses, wherein the detection of the summed energy, of the particular train of sequential sync pulses, having an energy level above the certain energy level, signals the advent of a particular train of sequential data pulses transmitted from a particular one of the plurality of sources.

4,688,252
IV SAP/STEREO AUDIO SYSTEM

George Kufta, Glenview, and David S. Tait, Addison, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Filed Dec. 19, 1985, Ser. No. 811,035
Int. Cl.[4] H04H 5/00
U.S. Cl. 381—4 6 Claims



1. A television SAP/stereo audio system including a 4.5 MHz detector comprising:

SAP detection means coupled to said 4.5 MHz detector for recovering SAP information;

stereo decoder means coupled to said 4.5 MHz detector for recovering stereo audio information;

stereo amplifier means;

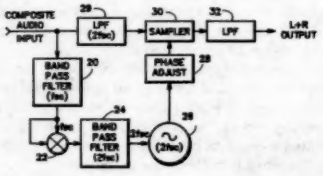
switching means selectively coupling the outputs of said SAP detection means and said stereo decoder means to said stereo amplifier means; and

window means, coupled to said 4.5 MHz detector and to said switching means, and responsive to SAP carrier levels for controlling said switching means to couple the output of said SAP detection means to said stereo amplifier means only for a limited range of detected SAP carrier levels defined by said window means.

4,688,253
L+R SEPARATION SYSTEM

Linley F. Gumm, Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Jul. 28, 1986, Ser. No. 889,490
Int. Cl.[4] H04H 5/00
U.S. Cl. 381—7 3 Claims



1. A separation system for recovering the sum component of a composite stereo signal having a sum component and a suppressed subcarrier difference component comprising:

means for generating from the composite stereo signal a sampling signal in synchronism with the suppressed subcarrier;

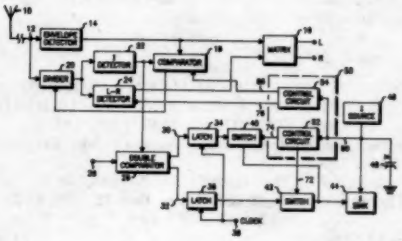
means for sampling the composite stereo signal with the sampling signal each time the suppressed subcarrier of the difference component is zero to eliminate the difference component, the output of the sampling means containing the sum component; and

means for recovering the sum component from the output of the sampling means.

4,688,254
CONTROLLED BLEND FOR AM STEREO RECEIVERS

Lawrence M. Ecklund, Wheaton, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 1, 1986, Ser. No. 846,775
Int. Cl.[4] H04H 5/00
U.S. Cl. 381—15 16 Claims



1. A control circuit as for use in an AM stereophonic receiver having input means for receiving an input signal consisting of a modulated carrier which is amplitude modulated by two signals, one in-phase and one in quadrature, and an in-phase synchronous detector means coupled to said input means for deriving a signal related to the in-phase modulation on said carrier, the circuit comprising:

comparator means coupled to said detector means for detecting negative amplitude overmodulation on said input signal and providing an output signal in response to at least one predetermined level of said overmodulation;

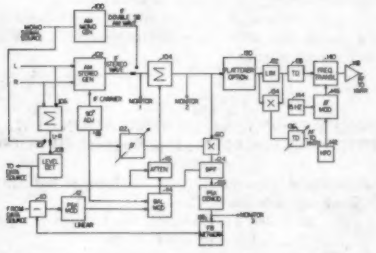
storage means coupled to said comparator means for storing a voltage which varies in response to the comparator output signal; and

control means coupled to said storage means for gradual control of at least a blend function within said stereophonic receiver.

4,688,255
COMPATIBLE AM BROADCAST/DATA TRANSMISIISON SYSTEM

Leonard R. Kahn, 137 E. 36th St., New York, N.Y. 10016

Continuation-in-part of Ser. No. 614,481, May 29, 1984, abandoned. This application May 8, 1985, Ser. No. 731,770
Int. Cl.[4] H04H 5/00
U.S. Cl. 381—16 18 Claims



1. A transmission system for transmitting amplitude modulated waves, suitable for reception by conventional amplitude modulation broadcast receivers, simultaneously with the transmission of data signals, comprising:

(a) means for generating an amplitude modulated wave fed

by a source of program material and a carrier wave source,

(b) data modulation means fed by a source of data said data modulator producing a wave in the audio range,

(c) a quadrature modulator fed by the source of carrier waves and by the data modulation means to produce a pair of quadrature modulation sidebands above and below the carrier frequency,

(d) means for linearly combining the waves produced by (a) and (c) means, and

(e) means, for increasing the power of the combined waves produced by (d) means without introducing significant additional spectrum products.

4,688,256

SPEECH DETECTOR CAPABLE OF AVOIDING AN INTERRUPTION BY MONITORING A VARIATION OF A SPECTRUM OF AN INPUT SIGNAL

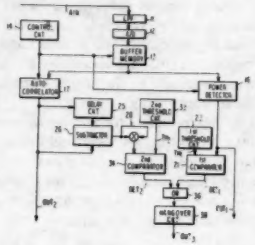
Satoshi Yasunaga, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Dec. 22, 1983, Ser. No. 564,651

Claims priority, application Japan, Dec. 22, 1982, 57-223893

Int. Cl.[4] G10L 5/00

U.S. Cl. 381—46 **7 Claims**



1. A speech detector responsive to an electrical input signal, said input signal comprising a speech signal representing speech and a further signal, for detecting presence of said speech signal, said input signal having electric power and having a spectrum representing an energy distribution of said input signal, said spectrum being variable with time in dependence on said speech and further signals, said detector comprising:

first means responsive to said input signal for detecting said electric power of said input signal to produce a first signal representative of said electric power;

second means responsive to said input signal for detecting a variation of said spectrum over time to produce a second signal representative of said variation; and

third means responsive to said first and said second signals for producing a third signal representative of presence of said speech signal.

4,688,257

SECURE WIRELESS COMMUNICATION SYSTEM UTILIZING LOCALLY SYNCHRONIZED NOISE SIGNALS

Bert K. Erickson, Fayetteville, N.Y., assignor to General Electric Company, Bridgeport, Conn.

Filed Jul. 17, 1984, Ser. No. 631,839

Int. Cl.[4] H04L 9/00

U.S. Cl. 380—48 **7 Claims**

1. A wireless communication system for the secure transmission of information between system users, said system comprising at least first and second transceiver units;

each of said units including:

a system interface comprising means for providing a message signal in response to information received from a system user;

a synchronization circuit;

a noise generator responsive to said synchronization circuit for generating a predetermined noise signal;

means for encoding said message signal with said noise signal;

means for transmitting said encoded message signal to another unit of said system

means for receiving the encoded message signal transmitted by another unit of said system;

means for decoding said received encoded message signal with said noise signal; and

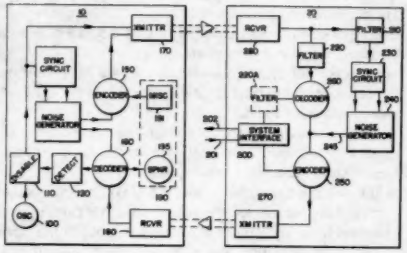
means in said interface for providing information to a system user in response to said decoded message signal;

said first unit further including:

means for generating a fixed frequency pilot signal,

means for applying said pilot signal to the input of the synchronization circuit of said first unit;

means for applying said pilot signal to said transmitting means for joint transmission with said encoded message signal;



means responsive to said decoding means for detecting an unsynchronized condition between the noise signals generated in respective ones of said units; and

means responsive to said detecting means for disabling said pilot signal upon the occurrence of said unsynchronized condition;

said second unit further including;

first filter means connected between said receiving means and the input of the synchronization circuit of said second unit, said first filter means being adapted to pass substantially only said pilot signal to said last-recited synchronization circuit; and

second filter means connected in series with said decoding means between said receiving means and said interface, said second filter means being adapted to substantially block said pilot signal; and

each of said synchronization circuits being responsive to the presence and absence of said pilot signal to provide clock pulses or reset pulses respectively to the corresponding noise generator, said reset pulses being adapted to reset all of said noise generators substantially simultaneously to the same initial state.

4,688,258

AUTOMATIC GRAPHIC EQUALIZER

Yoshiro Kunugi; Shinichi Suzuki, and Masayuki Kato, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Oct. 31, 1985, Ser. No. 793,384

Claims priority, application Japan, Oct. 31, 1984, 59-229990

Int. Cl.[4] H04R 3/04

U.S. Cl. 381—103 **5 Claims**

1. An automatic graphic equalizer comprising:

pink noise generating means;

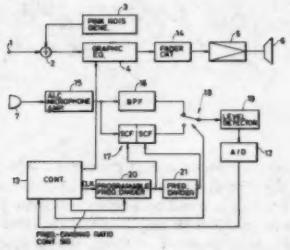
means for producing pink noise from said pink noise generating means on an audio signal line;

graphic equalizer means connected to said audio signal line for adjusting the frequency characteristics of received signals;

means for converting the output from said graphic equalizer means into a sound signal and for introducing said sound signal into a selected physical environment;

sound detecting means for detecting sound in said selected physical environment; and

control means for detecting the respective levels of the



signals detected by said sound detecting means in a plurality of frequency bands and for controlling the frequency characteristics of said graphic equalizer on the basis of the respective detected levels;

said control means including a frequency-variable band-pass filter for detecting the respective signal levels in said plurality of frequency bands, the center frequency of the pass-band of said band-pass filter being changeable by controlling filter circuit parameters; wherein said sound detecting means comprises a microphone and an automatic level control amplifier for amplifying the output of said microphone.

4,688,259

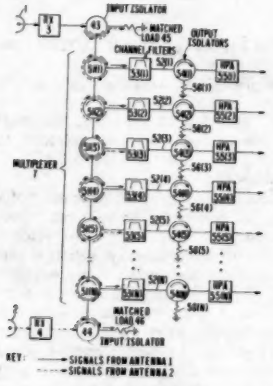
RECONFIGURABLE MULTIPLEXER

Michael J. Edridge, Sunnyvale, Calif., assignor to Ford Aerospace & Communications Corporation, Detroit, Mich.

Filed Dec. 11, 1985, Ser. No. 807,717

Int. Cl.[4] H04B *7/185*

U.S. Cl. 455—12 **8 Claims**



1. A reconfigurable multiplexer comprising a string of N series-connected field reversible circulators, where N is a positive integer; wherein

a first end of the string is coupled to a first source of electromagnetic energy, and a second end of the string is coupled to a second source of electromagnetic energy;

coupled to each circulator is a channelizing filter, wherein the N channelizing filters divide the electromagnetic energy from the two sources into a set of N frequency channels; and

the direction of rotation of electromagnetic energy within each circulator is selectively chosen so that selected ones of the N channels are assigned to the first source while selected others of the N channels are assigned to the second source.

4,688,260

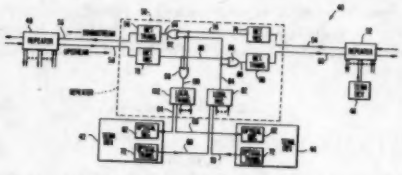
HIGH-RELIABILITY FIBER OPTIC REPEATER

Harold B. Shutterly, Edgewood Boro, and Joseph S. Malingowski, Wilkins Township, Allegheny County, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 9, 1985, Ser. No. 785,815

Int. Cl.[4] H04B *9/00*

U.S. Cl. 455—601 **19 Claims**



1. A fiber-optic repeater for connection to a plurality of terminal devices in a network having a first fiber and a second fiber, each terminal device having an optical receiver portion and an optical transmitter portion, comprising:

first network receiver means for receiving optical signals from said first fiber and generating electrical signals corresponding thereto;

local transmitter means for emitting light in response to said electrical signals generated by said first receiver means, said local transmitter means including a plurality of local electrical-to-optical converters and a mixing star having a plurality of light input fibers and a plurality of light output fibers, each local electrical-to-optical converter being optically coupled to at least one of said light input fibers and the optical receiver portions of said terminal devices being operatively connected to said light output fibers;

local receiver means operatively connected to the optical transmitter portions of said terminal devices for generating electrlcal signals in response to optical signals from said optical transmitter portions; and

first network transmitter means for emitting optical signals to said second fiber in response to electrical signals generated by said local receiver means.

4,688,261

FREQUENCY SYNTHESIZED MULTICHANNEL RADIO APPARATUS

James M. Killoway; David J. Stubbings, both of Cambridge, England, and Geoffrey S. Sparks, Geldrop, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 4, 1985, Ser. No. 707,640

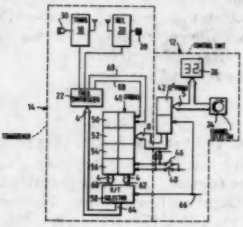
Claims priority, application United Kingdom, Mar. 2, 1984, 8405490

Int. Cl.[4] H04B *1/40, 11/16, 1/06*

U.S. Cl. 455—76 **8 Claims**

1. A multichannel radio apparatus comprising in combination: a transceiver including a frequency synthesiser and pro-

grammable storage means for storing predetermined channel frequency information; a remotely mountable control unit coupled to said transceiver, said control unit including means for selecting any one of a plurality of channels and an electrically alterable storage means, said electrically alterable storage means storing preselected addresses of locations in the programmable storage means which relate to said predetermined



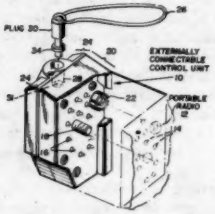
plurality of channels, said control unit further including an externally accessible interface adapted to operatively couple said electrically alterable storage means to a data transfer unit for programming or reprogramming the preselected addresses stored in such electrically alterable storage means to thereby change the channel frequency information for said plurality of channels.

4,688,262

EXTERNALLY CONNECTABLE CONTROL UNIT FOR A PORTABLE RADIO

Henry A. Schaefer, and Terry N. Garner, both of Lynchburg, Va., assignors to General Electric Company, Lynchburg, Va.

Filed Mar. 26, 1986, Ser. No. 844,152
Int. Cl.[4] H04B *1/38, 1/034*
U.S. Cl. 455—89 **7 Claims**



1. An externally connectable control unit for a portable radio having an array of externally accessible electrical contacts, said control unit comprising:

an array of plural electrical connector contacts matching the array of externally accessible contacts on the portable radio;

at least one control switch electrically connected with said array of connector contacts;

a switch housing having said array of contacts disposed externally thereon and also having said control switch disposed internally therewithin in association with a recess formed in the housing; and

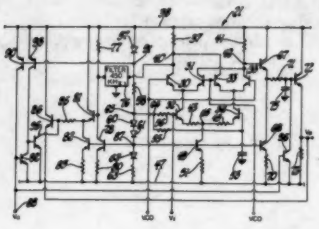
a removable plug means fitted within said recess to establish a first electrical condition of said control switch and which plug means is capable of being manually pulled out of the recess to establish a second electrical condition of the control switch.

4,688,263

INTEGRATED AM-FM MIXER

Fredrick A. Aldridge, Russiaville, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 28, 1986, Ser. No. 834,920
Int. Cl.[4] H04B *1/26*
U.S. Cl. 455—142 **4 Claims**



1. A mixer for use in a dual conversion AM-FM radio receiver of the type in which AM and FM broadcast RF signals are converted to a common first intermediate frequency for amplification in a first IF amplifier and then converted by the mixer to a second intermediate frequency for amplification in a second IF amplifier, the AM and FM outputs of the mixer requiring bandpass filtering of different passband widths, the mixer comprising, in combination:

a double balanced mixer circuit having a first input terminal for a local oscillator signal, a second input terminal for the signal at the first intermediate frequency and a pair of output terminals for complementary signals at the second intermediate frequency;

a narrow bandpass filter having an input connected to one of the output terminals of the double balanced mixer circuit;

first output transistor means having an input terminal connected to the output of the narrow bandpass filter and an output terminal;

second output transistor means having an input terminal connected to the other output terminal of the double balanced mixer circuit and an output terminal connected to the output terminal of the first transistor means;

transistor switch means responsive to an external signal to alternatively activate the first output transistor means only when the first IF signal is an AM signal and the second output transistor means only when the first IF signal is an FM signal, whereby only AM signals are passed through the narrow bandpass filter.

4,688,264

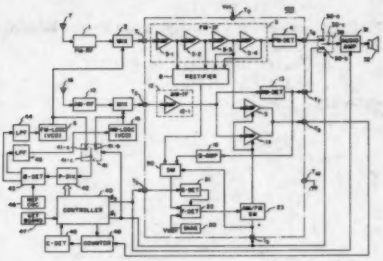
AM/FM RECEIVER WITH AUTOMATIC TUNING SYSTEM

Masami Miura, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Sep. 25, 1985, Ser. No. 780,161
Claims priority, application Japan, Sep. 26, 1984, 59-200904
Int. Cl.[4] H03J *7/18*
U.S. Cl. 455—168 **9 Claims**

4. In a receiver having a station detector of a type in which a frequency of an intermediate frequency signal is counted by a counter and a station detecting signal which is representative of a presence of a broadcasting station is generated when a count value of said counter is within a predetermined range, a combination comprising: an FM intermediate frequency amplifier stage, an AM intermediate frequency amplifier stage, means for producing a first signal when said station detecting signal is not generated, means responsive to said first signal for producing a second signal representing a receiving mode, means coupled to said FM and AM intermediate frequency amplifier stages for selecting either one of the signals derived

from the FM and AM intermediate frequency amplifier stages in response to said second signal, and means for supplying said



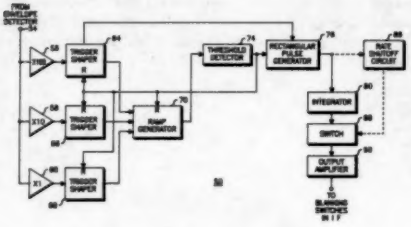
counter with the selected one of the signals derived from said FM and AM intermediate frequency amplifier stage.

4,688,265

DYNAMIC NOISE BLANKER CIRCUIT

Gary Chemelewski, N. Richland Hills, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 7, 1986, Ser. No. 882,643
Int. Cl.[4] H04B *1/10*
U.S. Cl. 455—223 **11 Claims**



9. A noise blanker circuit for use in a radio receiver and comprising:

input means for receiving a signal including a carrier modulated with an information signal and intermittent noise pulses;

pulse detector means for detecting a noise pulse in the received signal;

first circuit means for amplifying the detected pulse at a plurality of amplification levels and providing a control pulse at selected ones of a corresponding plurality of intermediate output terminals, the selection determined by the amplitude of the detected noise pulse;

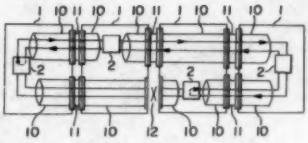
second circuit means coupled to each intermediate output terminal for providing a switch enabling signal derived from said control pulses and having an enabling period which is a function of said detected noise pulse amplitude.

4,688,266

CAR DATA TRANSMISSION DEVICE FOR OPTICAL FIBERS

Hajime Ochiai, Nishinomiya, and Kenji Morihara, Takarazuka, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 584,623, Feb. 29, 1984, abandoned.
This application Nov. 17, 1986, Ser. No. 931,030
Claims priority, application Japan, Mar. 2, 1983, 58-31389[U]
Int. Cl.[4] H04B *9/00*
U.S. Cl. 455—612 **2 Claims**



1. A fiber optic data transmission system comprising:

a plurality of stations which are to communicate with each other;

a first duplex data communication path having a first portion transmitting in a first direction and a second portion transmitting in a second direction wherein said duplex data communication path is connected between each of said plurality of stations and in order to provide a series connection of said stations;

a second duplex data communications path having a first portion for transmitting in said first direction and a second portion for transmitting in said second direction in said second duplex data communicating system is connected between each of said stations being parallel with said first data communications path;

a plurality of a first optical fiber lines wherein one of said first optical fiber lines is located within each station and wherein each of said first optical fiber line contains a part of said first portion of said first data communication path and a part of said second poriton of said second data communication path;

a plurality of second optical fiber lines wherein each station has one of said second fiber optical lines and wherein each of said second fiber optic lines contains a part of said second portion of said first data communication path and a part of said first portion of said second data communication path;

first plurality of jointing optical fiber means for connecting together adjacent ones of said plurality of first optical fiber lines wherein said first plurality of jointing optical fiber cable means are each positioned between adjoining stations;

a second plurality of jointing optical fiber means for connecting together adjacent ones of said second plurality of optical fiber lines wherein said second plurality of jointing optical fiber means are each positioned between adjoining stations;

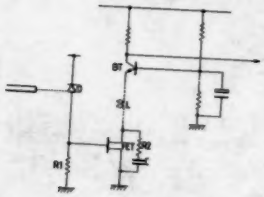
a plurality of control means each connected in each one of said stations wherein each one of said plurality of control means provides a first path of communication when there is an uninterrupted path in both said first and said second optical fiber lines and wherein at least two of said plurality of control mean are adjusted so as to provide a second communication path when one of said first and second optical fiber lines has had its communication paths interrupted.

4,688,267

OPTICAL FIBRE RECEIVER

David P. M. Chown, 22 Counting House Lane, Great Dunmow, Essex, and Malcolm Spencer, 3 Wychford Drive, Sawbridgeworth, Hertfordshire, both of United Kingdom

Filed Jan. 30, 1986, Ser. No. 824,023
Int. Cl.[4] H04B 9/00
U.S. Cl. 455—619 3 Claims



1. In an optical receiver of the type employing a PIN diode which diode receives a light beam to provide a current through the diode proportional to the light intensity received with said diode in series with a resistive impedance with the junction between the diode and said resistive impedance connected to the gate electrode of a field effect transistor (FET), with the drain electrode of said FET coupled to the emitter electrode of a NPN bipolar transistor and with the source electrode coupled to a point of reference potential, with the collector electrode of said NPN transistor coupled to a point of operating potential and with the base electrode coupled to said point of reference potential via a biasing impedance network, the improvement in combination therewith of apparatus for preventing instability at frequencies of the order of 1 GHz or greater comprising:

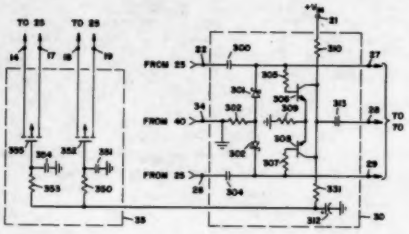
a series resistor-capacitor network connected across the drain and source electrodes of said FET with said resistor having a value which is low compared to said resistive impedance in series with said diode and wherein said capacitor has a low impedance value at frequencies of the order of 1 GHZ or higher, with said drain electrode coupled to said emitter electrode via a relatively long bond wire which serves as an inductive impedance having a high impedance compared to said capacitor impedance at frequencies of the order of 1 GHz or greater.

4,688,268

FIBER OPTIC RECEIVER HAVING A COMBINED BASELINE CLAMP AND AUTOMATIC GAIN CONTROL DETECTOR

John M. Holland, Shawsville, Va., assignor to Chevron Research Company, San Francisco, Calif.

Filed Jan. 11, 1984, Ser. No. 570,049
Int. Cl.[4] H04B 9/00
U.S. Cl. 455—619 10 Claims



1. A combined baseline clamp and automatic gain control detector comprising:

means for providing a first data signal;

means for providing a second data signal identical to said first data signal but shifted 180° in phase;

a first clamping diode having a first electrode coupled to said means for providing a first data signal and having a second electrode coupled to a common potential;

a second clamping diode having a first electrode coupled to said means for providing a second data signal and having a second electrode coupled to the common potential;

a first transistor having a base coupled to said first electrode of said first clamping diode, having an emitter and having a collector; and

a second transistor having a base coupled to said first electrode of said second clamping diode, having an emitter coupled to said emitter of said first transistor, and having a collector coupled to said collector of said first transistor;

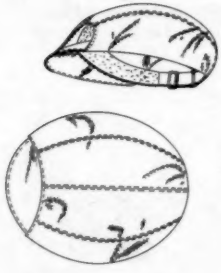
wherein the signal from said coupled collectors of said first transistor and said second transistor is a gain control signal.

DESIGNS

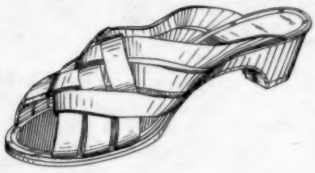
AUGUST 18, 1987

291,380
ANTI-MOLESTATION DEVICE
Danny R. Ashley, 8412 Dunn Hill La., Hixson, Tenn. 37343
Filed Mar. 8, 1985, Ser. No. 709,904
Term of patent 14 years
U.S. Cl. D2—1

291,381
VENTILATED ATHLETIC CAP
David A. Fender, 384 Pheasant Run Rd., Harleysville, Pa. 19438
Filed Mar. 11, 1985, Ser. No. 710,396
Term of patent 14 years
U.S. Cl. D2—247



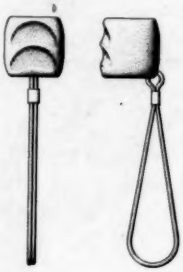
291,382
SANDAL
Giuseppe Vaccaro, Möhlin, Switzerland, assignor to Bata-Schuh AG, Mohlin, Switzerland
Filed Feb. 20, 1985, Ser. No. 703,503
Claims priority, application Switzerland, Aug. 21, 1984, DM/004112
Term of patent 14 years
U.S. Cl. D2—292



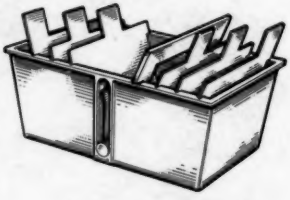
291,383
SPORT SHOE
Robert B. Campbell, New York, N.Y., and Junichi P. Landau, Taipei, Taiwan, assignors to BBC International Ltd., New York, N.Y.
Division of Ser. No. 478,149, Mar. 23, 1983. This application May 29, 1985, Ser. No. 738,736
Term of patent 14 years
U.S. Cl. D2—309

291,384
SPORT SHOE
Robert B. Campbell, New York, N.Y., and Junichi P. Landau, Taipei, Taiwan, assignors to BRC International Ltd., New York, N.Y.
Division of Ser. No. 738,736, May 29, 1985. This application Dec. 5, 1985, Ser. No. 805,445
Term of patent 14 years
U.S. Cl. D2—309

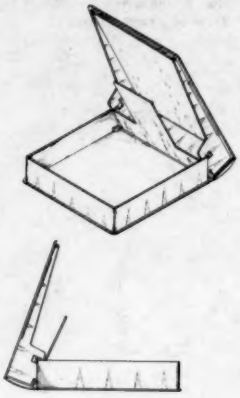
291,385
UMBRELLA HANDLE
Julie A. Selig, Cincinnati, Ohio, assignor to 'totes', incorporated, Loveland, Ohio
Filed Nov. 7, 1985, Ser. No. 805,058
Term of patent 14 years
U.S. Cl. D3—12



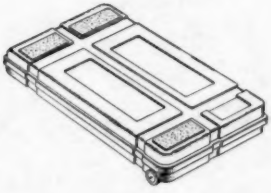
291,386
BASKET FOR MEMORY DISCS WITH INDEXCARDS
Inga-Lisa Johansson, Töreboda, Sweden, assignor to Industri AB Dahlstedt & Johansson, Toreboda, Sweden
Filed Oct. 26, 1984, Ser. No. 665,244
Claims priority, application Sweden, Apr. 26, 1984, 84-1348
Term of patent 14 years
U.S. Cl. D3—35



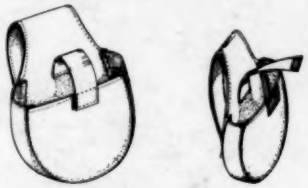
291,387
MAGNETIC DISK CASE
Robert A. Egly, 31 Belcourt South, Newport Beach, Calif. 92660
Filed Mar. 22, 1985, Ser. No. 714,853
Term of patent 14 years
U.S. Cl. D3—35



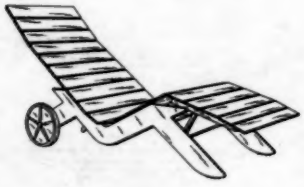
291,388
PORTABLE CASE FOR MODULAR EXHIBIT PANELS OR THE LIKE
Pierre Seguin, Montreal, Canada, assignor to Fedor-Expositions Inc., Montreal, Canada
Filed Aug. 29, 1983, Ser. No. 527,561
The portion of the term of this patent subsequent to Sep. 18, 2000, has been disclaimed.
Term of patent 14 years
U.S. Cl. D3—77



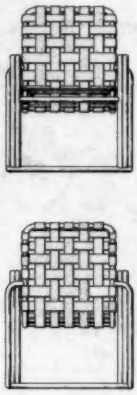
291,389
SNUFF BOX HOLDER
Marion C. Crymes, 6321 Lawrenceville Hwy., Tucker, Ga. 30084
Filed Jun. 7, 1985, Ser. No. 742,480
Term of patent 14 years
U.S. Cl. D3—106



291,390
LOUNGE CHAIR
Luigi Biscarini, Marsciano, Italy, assignor to EMU S.p.A., Italy
Filed Mar. 5, 1985, Ser. No. 708,292
Claims priority, application Italy, Sep. 7, 1984, 23038/84[U]
Term of patent 14 years
U.S. Cl. D6—361

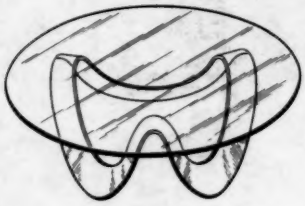


291,391
CHAIR
James R. Arthur, Jr., Birmingham, Ala., assignor to Marathon Corporation, Birmingham, Ala.
Filed Mar. 22, 1985, Ser. No. 714,013
Term of patent 14 years
U.S. Cl. D6—370

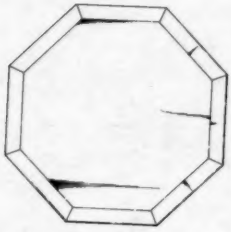


291,392
DISPENSING BOX FOR DENTURE CLEANSING TABLETS
Ken Worthen, 2200 Courtleigh Dr., Apt. A, Bakersfield, Calif. 93309
Filed Mar. 25, 1985, Ser. No. 715,731
Term of patent 14 years
U.S. Cl. D6—440

291,393
TABLE
Vittorio Livi, Pesaro, Italy, assignor to Fiam S.r.l., Pesaro, Italy
Filed Feb. 1, 1985, Ser. No. 697,388
Claims priority, application Italy, Aug. 6, 1984, 22807/84[U]
Term of patent 14 years
U.S. Cl. D6—482

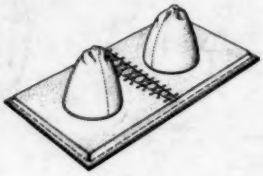


291,394
TABLE
Kevin T. Dunwell, 729 9th St., Santa Monica, Calif. 90402
Filed Jan. 17, 1985, Ser. No. 692,943
Term of patent 14 years
U.S. Cl. D6—487

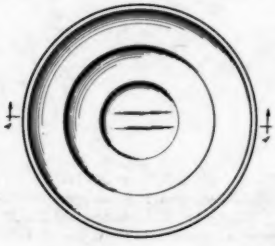


291,395
CORDLOCK FOR RAISABLE BLIND
Petrus J. Hennequin, Oldenoord 52, Rotterdam, Netherlands
Filed Jun. 5, 1984, Ser. No. 617,618
Claims priority, application Switzerland, Dec. 5, 1983, DM/003169
Term of patent 14 years
U.S. Cl. D6—580

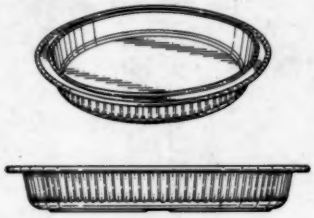
291,396
PILLOW
Alvin H. Smith, 10720 Lakewood Blvd., Apt. #209, Downey, Calif. 90241
Filed Feb. 4, 1985, Ser. No. 698,144
Term of patent 14 years
U.S. Cl. D6—599



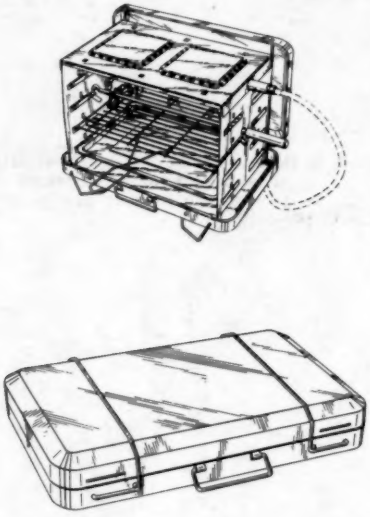
291,397
SAUCER OR SIMILAR ARTICLE
Steve A. Unger, Manilus, N.Y., assignor to Syracuse China Corporation, Syracuse, N.Y.
Filed Apr. 13, 1984, Ser. No. 600,313
Term of patent 14 years
U.S. Cl. D7—23



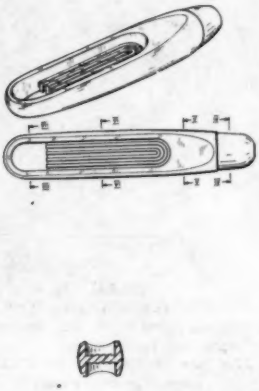
291,398
QUICHE PAN OR THE LIKE
Janice L. Schmidt, Providence, R.I., assignor to Dart Industries Inc., Northbrook, Ill.
Filed Feb. 6, 1985, Ser. No. 698,709
Term of patent 14 years
U.S. Cl. D7—28



291,399
COMBINED BARBECUE GRILL AND SPIT
Ming K. Chan, 1st Floor, 58 Hung To Road, Kowloon, Hong Kong
Filed Jan. 28, 1985, Ser. No. 695,619
Claims priority, application United Kingdom, Sep. 5, 1984, 1021907
Term of patent 14 years
U.S. Cl. D7—337



291,400
HANDLE FOR KITCHEN TOOLS OR THE LIKE
Gianpiero Pedrini, Via Val Passiria, 31 Brescia, Italy
Filed Sep. 15, 1983, Ser. No. 532,345
Claims priority, application Italy, Mar. 30, 1983, 21322/83[U]
The portion of the term of this patent subsequent to Aug. 18, 2000, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—395



291,401
HOLDER FOR A GENERATOR
Nicholas F. DeNardis, 1128 W. Ives St., Marshfield, Wis. 54449
Filed Jul. 5, 1984, Ser. No. 627,823
Term of patent 14 years
U.S. Cl. D8—71

291,402
HAMMER
Nick J. Square, 6410 Middle Ridge Rd., Madison, Ohio 44057
Filed Jul. 9, 1984, Ser. No. 629,193
Term of patent 14 years
U.S. Cl. D8—75

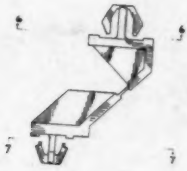
291,403
HANDLE FOR MANUAL TOOLS
Abraham Rosenberg, Tierra Verde, Fla., assignor to Vermont American Corporation, Louisville, Ky.
Filed Nov. 20, 1984, Ser. No. 673,538
Term of patent 14 years
U.S. Cl. D8—83

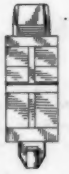
291,404
TOOL HANDLE
Donald P. Cummings, Sturbridge, and Robert T. Howitt, Leominster, both of Mass., assignors to Hyde Mfg. Co., Southbridge, Mass.
Filed Dec. 17, 1984, Ser. No. 682,535
Term of patent 14 years
U.S. Cl. D8—107

291,405
HANDLE
Alvin B. Finesman, New Canaan, Conn.; Carson E. Ahlman, Hackensack; Morris G. Grossman, Fort Lee, both of N.J., and Arthur Eugster, Romanshorn, Switzerland, assignors to Salton, Inc., Chicago, Ill.
Filed Apr. 12, 1985, Ser. No. 722,846
Term of patent 14 years
U.S. Cl. D8—317

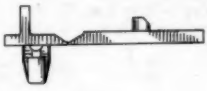
291,406
HINGE SHIM PLATE
Curtis W. McNeese, P.O. Box 3, Kerens, Tex. 75144
Filed Jun. 3, 1985, Ser. No. 740,588
Term of patent 14 years
U.S. Cl. D8—323

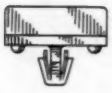
291,407
HINGE
Masaru Yagi, Tsushima, Japan, assignor to Kitagawa Industries Co., Ltd., Nagoya, Japan
Filed Feb. 15, 1985, Ser. No. 702,258
Claims priority, application Japan, Sep. 19. 1984, 59-38940
Term of patent 14 years
U.S. Cl. D8—325



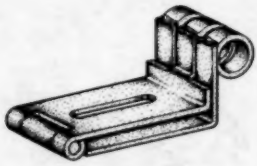


291,408
HINGE
Yoshihito Nakano, Yokohama, Japan, assignor to Kitagawa Industries Co., Ltd., Nagoya, Japan
Filed Feb. 15, 1985, Ser. No. 702,309
Claims priority, application Japan, Sep. 18, 1984, 59-39536
Term of patent 14 years
U.S. Cl. D8—325



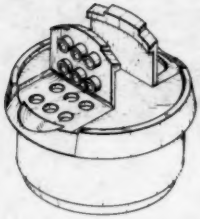


291,409
HINGED FASTENER
John H. Themistos, East Longmeadow, and William P. Brady, Wilbraham, both of Mass., assignors to Secure-it Inc., Long Meadow, Mass.
Filed Jun. 20, 1984, Ser. No. 622,772
Term of patent 14 years
U.S. Cl. D8—382

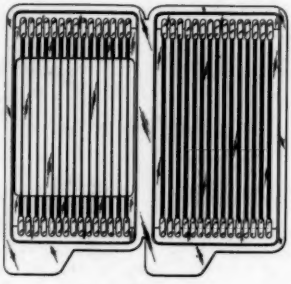


291,410
CABLE STRAP
Gerhard W. Czyborra, St-Leonard, Canada, assignor to Microlectric Canada Ltd., Montreal, Canada
Filed Mar. 8, 1985, Ser. No. 709,725
Term of patent 14 years
U.S. Cl. D8—394

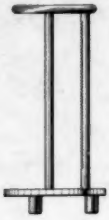
291,411
RECLOSABLE DISPENSER TOP
John C. Crawford, Lake Mahopac, N.Y., assignor to Colgate-Palmolive Company, New York, N.Y.
Filed Jan. 14, 1985, Ser. No. 691,092
Term of patent 14 years
U.S. Cl. D9—440



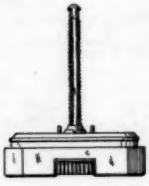
291,412
PACKAGE OF DENTAL FLOSS HOLDER DEVICES
Ingram S. Chodorow, Upper Saddle River, N.J., and Roberto D. Franchi, Warwick, R.I., assignors to Placontrol Corp., Montvale, N.J.
Filed Oct. 24, 1984, Ser. No. 664,221
Term of patent 14 years
U.S. Cl. D9—337



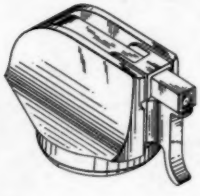
291,413
WAFER HOLDING FRAME
Akira Uehara; Isamu Hijikata; Hisashi Nakane, all of Kanagawa, and Muneo Nakayama, Tokyo, all of Japan, assignors to Tokyo Denshi Kagaku Co., Ltd., Kanagawa, Japan
Filed Jan. 8, 1985, Ser. No. 689,661
Claims priority, application Japan, Jul. 30, 1984, 59-32223
Term of patent 14 years
U.S. Cl. D9—367



291,414
BASE FOR DISPENSING CONTAINER
James M. Keeler, Ridgewood, and John A. Grip, Wayne, both of N.J., assignors to American Cynamid Company, Stamford, Conn.
Filed Nov. 14, 1984, Ser. No. 671,652
Term of patent 14 years
U.S. Cl. D9—434



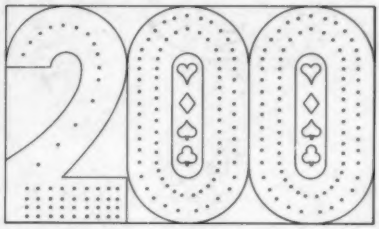
291,415
AEROSOL SPRAYER ACTUATOR
Robert H. Abplanalp, 10 Hewitt Ave., Bronxville, N.Y. 10708
Continuation of Ser. No. 732,890, May 8, 1985, abandoned, which is a continuation of Ser. No. 456,405, Jan. 7, 1983, abandoned. This application Apr. 27, 1986, Ser. No. 869,443
Term of patent 14 years
U.S. Cl. D9—448



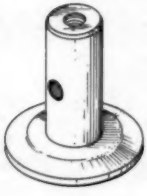
291,416
CLOCK
Fernando C. Richards, 56 Peabody St., Salem, Mass. 01970
Filed Feb. 23, 1984, Ser. No. 583,055
Term of patent 14 years
U.S. Cl. D10—7

291,417
SPIRAL CRIBBAGE SCORER
Scott E. Morgan, P.O. Box 595, North St., Calais, Me. 04619
Filed Jan. 7, 1985, Ser. No. 689,285
Term of patent 14 years
U.S. Cl. D10—46.1

291,418
GAME SCORING BOARD
Jeff Z. Cormier, 102 Church St., Moncton, New Brunswick, Canada E1C 4Z5
Filed Mar. 12, 1985, Ser. No. 710,815
Claims priority, application Canada, Sep. 13, 1984, 13-09-84-9
Term of patent 14 years
U.S. Cl. D10—46.1

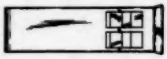


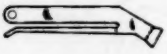
291,419
CYLINDRICAL ONE-TO-ONE FORCE-BALANCE FLUID PRESSURE SENSOR COMPONENT
Irwin P. Linzer, 175 Welsh Rd., Lebanon, N.J. 08833
Filed May 28, 1985, Ser. No. 738,654
Term of patent 14 years
U.S. Cl. D10—85



291,420
SIGNAL LIGHT LENS
Kathleen M. Kohl, 37 Hogan Rd., Fairport, N.Y. 14450
Filed Aug. 1, 1985, Ser. No. 761,539
Term of patent 14 years
U.S. Cl. D10—114

291,421
WHISTLE
Mark A. Lance, Melbourne, Australia, assignor to W. A. Deutsher Pty. Ltd., Moorabbin, Australia
Filed Oct. 10, 1985, Ser. No. 785,979
Claims priority, application Australia, Apr. 11, 1985, 0900/85
Term of patent 14 years
U.S. Cl. D10—119





291,422
NECKLACE
Marina Bulgari, Athens, Greece, assignor to Marina B. Creation S.A., Vaduz, Liechtenstein
Filed Apr. 11, 1985, Ser. No. 721,996
Claims priority, application Italy, Oct. 12, 1984, 36142/84[U]
Term of patent 14 years
U.S. Cl. D11—3

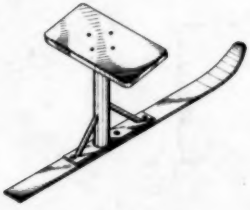
291,423
RING
Ivan I. Lajoie, Markham, Canada, assignor to 579874 Ontario Inc., Toronto, Canada
Filed Mar. 29, 1985, Ser. No. 717,680
Term of patent 14 years
U.S. Cl. D11—26

291,424
RING
Marina Bulgari, Athens, Greece, assignor to Marina B. Creation S.A., Vaduz, Liechtenstein
Filed Apr. 12, 1985, Ser. No. 722,333
Claims priority, application Italy, Oct. 12, 1984, 36147/84[U]
Term of patent 14 years
U.S. Cl. D11—34

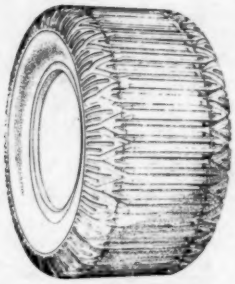
291,425
JEWELRY PENDANT
Judy D. Webb, 7625 Thousand Oaks Dr., Tujunga, Calif. 91042
Filed Apr. 4, 1985, Ser. No. 719,992
Term of patent 14 years
U.S. Cl. D11—83

291,426
TERRARIUM OR THE LIKE
Joseph W. Husbands, P.O. Box 88, Delta, Ala. 36258
Filed Nov. 29, 1984, Ser. No. 676,805
Term of patent 14 years
U.S. Cl. D11—145

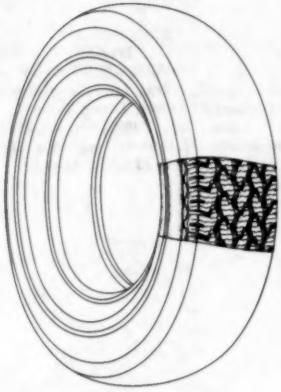
291,427
SNOW SLED
Ronald A. Schaller, Sandy; Wesley L. Steffensen, Salt Lake City, and Philip W. Wright, Bountiful, all of Utah, assignors to Metalfab, Inc., West Valley City, Utah
Filed Feb. 6, 1985, Ser. No. 698,829
Term of patent 14 years
U.S. Cl. D12—10



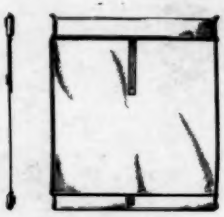
291,428
VEHICLE TIRE
Masami Shinomiya, and Hisashi Shintomi, both of Osaka, Japan, assignors to Ohtsu Tire & Rubber Co., Osaka, Japan
Filed Nov. 30, 1984, Ser. No. 676,994
Claims priority, application Japan, Jun. 27, 1984, 59-26607
Term of patent 14 years
U.S. Cl. D12—146



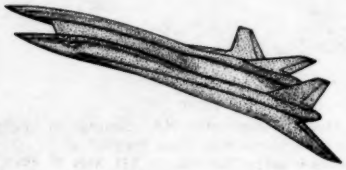
291,429
TIRE
Ronald L. Messer, Simpsonville, S.C., assignor to Michelin Recherche et Technique S.A., Basel, Switzerland
Continuation-in-part of Ser. No. 496,811, May 20, 1983, abandoned. This application Feb. 21, 1985, Ser. No. 703,827
Term of patent 14 years
U.S. Cl. D12—147



291,430
AUTOMOBILE WINDOW SHADE
Armand Vartanian, and Ronald G. LeFevre, both of 4548 Winnetka Ave., Woodland Hills, Calif. 91364
Filed May 2, 1985, Ser. No. 729,577
Term of patent 14 years
U.S. Cl. D12—191

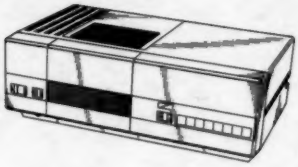


291,431
AIRCRAFT
Gordon Rosenthal, Jericho, N.Y., assignor to Fairchild Industries, Inc., Chantilly, Va.
Filed Apr. 10, 1985, Ser. No. 721,689
Term of patent 14 years
U.S. Cl. D12—333

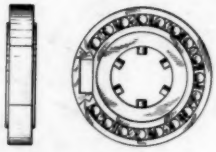


291,432
POWER GENERATOR
Tadahiro Yaguchi, Niiza, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Feb. 5, 1985, Ser. No. 698,597
Claims priority, application Japan, Aug. 10, 1984, 59-34145
Term of patent 14 years
U.S. Cl. D13—2

291,433
CRADLE FOR A COMBINED VIDEO CAMERA AND TAPE RECORDER
Takayoshi Inai, Kagawa; Masaharu Katayama, Ehime; Noriyuki Arai, Ehime, and Masaki Takemoto, Ehime, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Jun. 20, 1984, Ser. No. 622,609
Claims priority, application Japan, Dec. 20, 1983, 58-54824
Term of patent 14 years
U.S. Cl. D14—5



291,434
REEL HUB FOR CASSETTE TAPE
Kazumi Fujimoto, Hino, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed Aug. 1, 1984, Ser. No. 636,561
Claims priority, application Japan, Feb. 16, 1984, 59-5432
The portion of the term of this patent subsequent to Aug. 11, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D14—11



291,435

AUTOMATIC TELEPHONE ANSWERING AND RECORDING MACHINE

Kazuhiko Kawano, and Toru Tsunetsugu, both of Tokyo, Japan, assignors to Pioneer Ansafone Manufacturing Corporation, Saitama, Japan

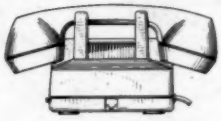
Filed Jul. 10, 1985, Ser. No. 753,487
Term of patent 14 years
U.S. Cl. D14—52

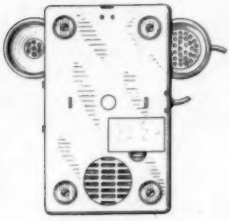
291,436

TELEPHONE SET

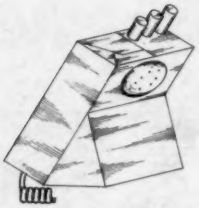
Wilbert C. Brown, Fairfield, Conn.; Roger J. Tosto, Yorktown Heights, N.Y., and Eric K. Babbitt, Shelton, Conn., assignors to TIE/communications, Inc., Shelton, Conn.

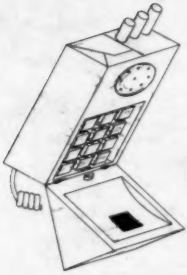
Filed Apr. 13, 1984, Ser. No. 600,131
Term of patent 14 years
U.S. Cl. D14—53



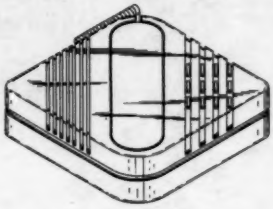


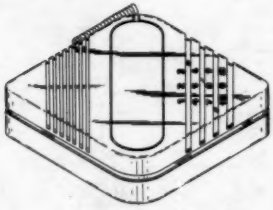
291,437
TELEPHONE
Peter Lee, 2Fl., 7, Lane 93, Paoping Rd., Yungho City, Taipei Hsien, Taiwan
Filed Oct. 5, 1984, Ser. No. 657,824
Term of patent 14 years
U.S. Cl. D14—53



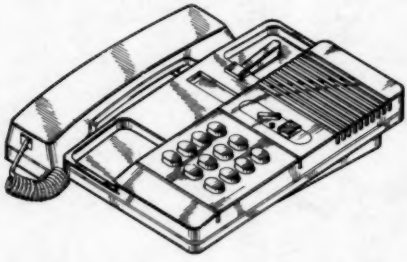


291,438
TELEPHONE
Ronald C. Banko, North Wales, Pa., assignor to Ron Banko Designs, Inc., North Wales, Pa.
Filed Jan. 25, 1985, Ser. No. 695,130
Term of patent 14 years
U.S. Cl. D14—53

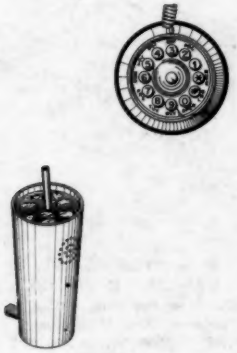




291,439
TELEPHONE SET
Richard Wu, 12/F., No.126, Nan-Kin E. Rd., Sec.4, Taipei, Taiwan
Filed Jul. 25, 1985, Ser. No. 758,995
Term of patent 14 years
U.S. Cl. D14—53



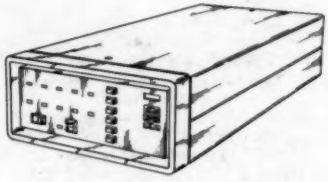
291,440
HANDSET TELEPHONE
Takei Yoshiharu, Shatin, Hong Kong, assignor to Tasca International Ltd., Kowloon, Hong Kong
Filed Nov. 6, 1986, Ser. No. 927,690
Claims priority, application United Kingdom, Jul. 29, 1986, 1035715
Term of patent 14 years
U.S. Cl. D14—64



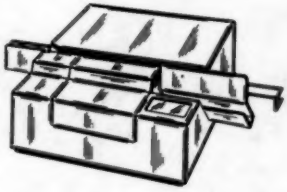
291,441
TELEVISION RECEIVER
Hiroaki Nishiyori; Nobuo Momota; Masao Yoshikawa; Akishige Sai, and Kazutoshi Masunari, all of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Jan. 16, 1985, Ser. No. 691,794
Claims priority, application Japan, Jul. 26, 1984, 59-31373
Term of patent 14 years
U.S. Cl. D14—77

291,442
COMPUTER
Masaki Kurihara, Suwa, Japan, assignor to Epson Corporation, Tokyo, Japan
Filed Sep. 24, 1984, Ser. No. 653,800
Claims priority, application Japan, Mar. 28, 1984, 59-12046
Term of patent 14 years
U.S. Cl. D14—106

291,443
TRANSMITTER/RECEIVER MODEM
Gilbert Pedinielli, Nice, and Daniel Richelet, Saint Barnabe, both of France, assignors to International Business Machines Corp., Armonk, N.Y.
Filed Feb. 26, 1985, Ser. No. 705,776
Claims priority, application European Patent Office, Aug. 30, 1984, 843824
Term of patent 14 years
U.S. Cl. D14—107



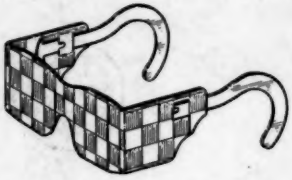
291,444
PRINTER
Kunio Akiyama, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Jun. 20, 1985, Ser. No. 747,117
Claims priority, application Japan, Dec. 20, 1984, 59-52854
Term of patent 14 years
U.S. Cl. D14—111



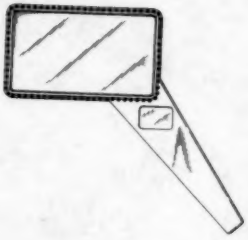
291,445
THREE POINT HITCH BRACKET
Thomas I. Burenga, Litchfield, Ill., assignor to Worksaver, Inc., Litchfield, Ill.
Filed Jun. 28, 1984, Ser. No. 625,858
Term of patent 14 years
U.S. Cl. D15—28

291,446
COMBINED MAST ASSEMBLY WITH YARN TENSION AND CUTTER GATE AND THREADING HOOK UNITS FOR CREELS
Marlin Van Wilson, Rte. 1, Box 449, Barboursville, Va. 22923
Filed Dec. 18, 1984, Ser. No. 683,132
Term of patent 14 years
U.S. Cl. D15—78

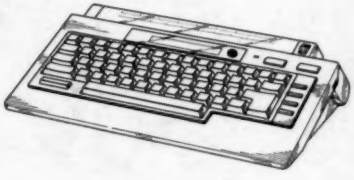
291,447
SUNGLASSES
Philip E. Fletcher, 5330 Hialeah, Houston, Tex. 77092, and Jeffery A. Briden, 1600 SW. Pkwy. #202, College Sta., Tex. 77840
Filed Aug. 15, 1985, Ser. No. 765,672
Term of patent 14 years
U.S. Cl. D16—119



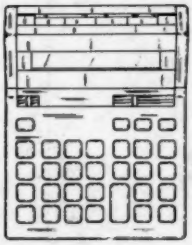
291,448
DUAL MAGNIFYING GLASS
Wong Tai-Kam, Kam Mow Industrial Bldg., 1F., Flat B, 44 Belcher's Street, Kennedy Town, Hong Kong
Filed Oct. 24, 1984, Ser. No. 664,488
Claims priority, application United Kingdom, Jun. 28, 1984, 1020603
Term of patent 14 years
U.S. Cl. D16—135

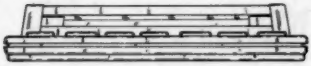


291,449
TYPEWRITER
Isshin Miyamoto; Yasuo Nagamatsu; Yasuhiko Tanaka; Masataka Hidaka; Masaharu Sakamoto, and Hideaki Sakamoto, all of Fukuoka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Sep. 12, 1985, Ser. No. 775,289
Claims priority, application Japan, Mar. 15, 1985, 60-10431
Term of patent 14 years
U.S. Cl. D18—1

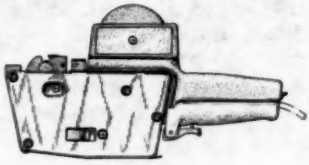


291,450
ELECTRONIC DESK CALCULATOR
Bernd Gubbe, Nuremberg, and Klaus-Diether Krause, Oberasbach, both of Fed. Rep. of Germany, assignors to Triumph-Adler A.G., Nuremberg, Fed. Rep. of Germany
Filed Jun. 5, 1985, Ser. No. 741,502
Claims priority, application Fed. Rep. of Germany, Dec. 19, 1984, MRV11167
Term of patent 14 years
U.S. Cl. D18—7





291,451
AIR DRIVEN LABELLER
D. Dwain Conley, Kingston, Mass., assignor to Esselte Pendaflex Corporation, Garden City, N.Y.
Filed Aug. 28, 1984, Ser. No. 645,016
Term of patent 14 years
U.S. Cl. D18—19

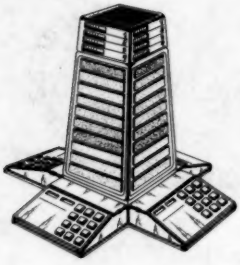


291,452
CAP FOR WRITING INSTRUMENTS
Kimio Kodera, Siki, Japan, assignor to Platinum Pen Co., Ltd., Tokyo, Japan
Filed Aug. 27, 1984, Ser. No. 644,334
Claims priority, application Japan, Feb. 29, 1984, 59-27438[U]; Feb. 27, 1984, 59-6859
Term of patent 14 years
U.S. Cl. D19—57

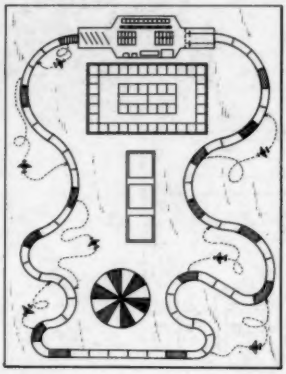
291,453
PAPER WEIGHT OR SIMILAR ARTICLE
Jean-Jacques Durand, LaBute 62510, Arques, France
Filed Sep. 11, 1984, Ser. No. 649,412
Term of patent 14 years
U.S. Cl. D19—96

291,454
SIGN PANEL
John Broadfoot, 202-402 Major Mackenzie Dr. East, Richmond Hill, Ontario, Canada L4C 1J6
Filed Oct. 3, 1985, Ser. No. 783,913
Term of patent 14 years
U.S. Cl. D20—40

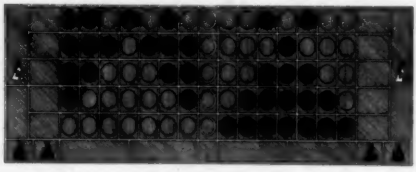
291,455
ELECTRONIC GAME MACHINE WITH INTEGRAL TIMER
Jeffrey M. Moskin, Los Angeles, Calif., assignor to Mabco, Inc., Inglewood, Calif.
Filed Jul. 6, 1984, Ser. No. 628,432
Term of patent 14 years
U.S. Cl. D21—13



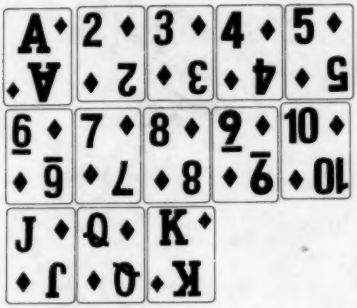
291,456
GAME BOARD
Keith B. Byington, 501 Water Oak Rd., Virginia Beach, Va. 23452
Filed Jul. 13, 1984, Ser. No. 630,446
Term of patent 14 years
U.S. Cl. D21—25



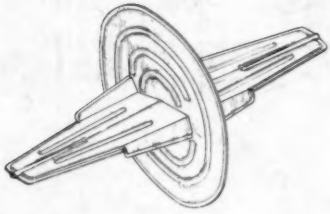
291,457
GAME LAYOUT SHEET
Michael E. Riordan, 3010 Sorrel, Las Vegas, Nev. 89102, and Daniel A. Jones, 422 Amy Ave., Louisville, Ky. 40212
Filed Feb. 13, 1985, Ser. No. 701,229
Term of patent 14 years
U.S. Cl. D21—37



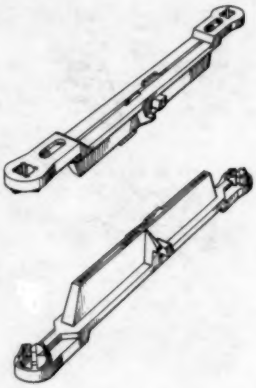
291,458
DECK OF PLAYING CARDS
Bill J. Raheb, Matawan, N.J., assignor to Old Bridge Playing Card Co., Inc., Matawan, N.J.
Filed Jun. 7, 1984, Ser. No. 618,128
Term of patent 14 years
U.S. Cl. D21—45



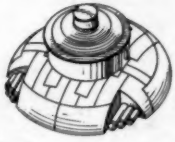
291,459
ROTATABLE TOY KITE
Billy D. Ruggles, Belvidere, Ill., assignor to Du-Call Miller Plastics Inc., Lisle, Ill.
Filed Sep. 13, 1985, Ser. No. 775,579
Term of patent 14 years
U.S. Cl. D21—88

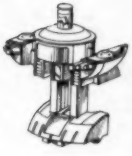


291,460
TOY CONSTRUCTION PIECE
Giuseppe Mazzoleni, Valle S. Bartolomeo, Italy, assignor to Creative S.R.L., Italy
Filed May 25, 1984, Ser. No. 613,991
Term of patent 14 years
U.S. Cl. D21—108

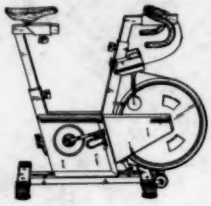


291,461
RECONFIGURABLE TOY VEHICLE
Akio Kitamura, Higashi-Mukojima, Japan, assignor to Takara Co., Ltd., Tokyo, Japan
Filed Mar. 21, 1985, Ser. No. 715,062
Claims priority, application Japan, Oct. 25, 1984, 59-44104
Term of patent 14 years
U.S. Cl. D21—150



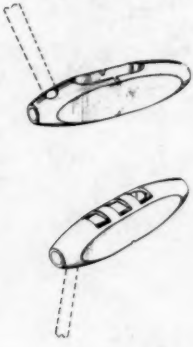


291,462
ERGOMETER
Aimo Aalto, Turku, Finland, assignor to Tunturipyora OY, Turku, Finland
Filed Feb. 20, 1985, Ser. No. 703,407
Claims priority, application Finland, Sep. 4, 1984, 851/84
Term of patent 14 years
U.S. Cl. D21—194

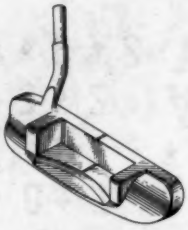


291,463
MANUAL SKEET THROWER
Robert M. Hartt, R.F.D. #1, Box 5100, Morrisville, Vt. 05661
Filed Feb. 14, 1985, Ser. No. 701,781
Term of patent 14 years
U.S. Cl. D21—210

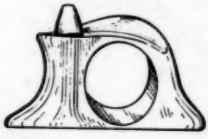
291,464
PUTTER HEAD
Tom A. Whitley, P.O. Box 190445, Dallas, Tex. 75219
Filed Dec. 24, 1984, Ser. No. 685,549
Term of patent 14 years
U.S. Cl. D21—219



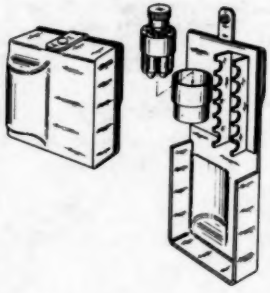
291,465
GOLF CLUB HEAD
Anthony J. Antonious, 205 E. Joppa Rd., Towson, Md. 21204
Filed Jan. 14, 1985, Ser. No. 690,950
Term of patent 14 years
U.S. Cl. D21—219



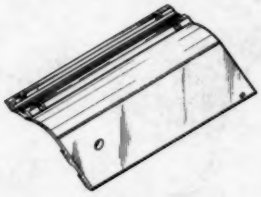
291,466
POOL CUE BRIDGE
Ernest C. Taube, 6214 W. Lincoln Ave., West Allis, Wis. 53219
Filed Apr. 3, 1985, Ser. No. 719,577
Term of patent 14 years
U.S. Cl. D21—232



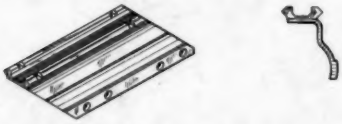
291,467
CARTRIDGE HOLDER
Saide Abdo, 3005 Herrick Dr., Lansing, Mich. 48910
Filed Dec. 18, 1984, Ser. No. 683,156
Term of patent 14 years
U.S. Cl. D22—108



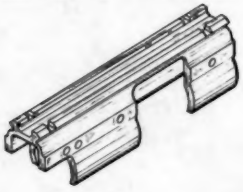
291,468
SCOPE MOUNT FOR A SHOTGUN
Daniel L. Bechtel, P.O. Box 11281, Fort Worth, Tex. 76109
Filed Jan. 2, 1985, Ser. No. 688,250
Term of patent 14 years
U.S. Cl. D22—110



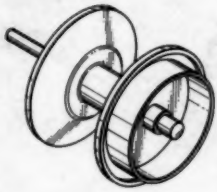
291,469
RIFLE SCOPE MOUNT
Daniel L. Bechtel, P.O. Box 11281, Fort Worth, Tex. 76109
Filed Jan. 2, 1985, Ser. No. 688,253
Term of patent 14 years
U.S. Cl. D22—110



291,470
PISTOL SCOPE MOUNT
Daniel L. Bechtel, P.O. Box 11281, Fort Worth, Tex. 76109
Filed Jan. 2, 1985, Ser. No. 688,254
Term of patent 14 years
U.S. Cl. D22—110



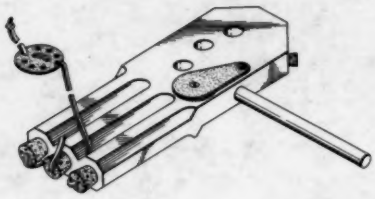
291,471
FISHING REEL SPOOL
Kaname Yamaguchi, Tokyo, Japan, assignor to Daiwa Seiko, Inc., Tokyo, Japan
Filed Jan. 8, 1985, Ser. No. 689,693
Claims priority, application Japan, Aug. 8, 1984, 59-33599
Term of patent 14 years
U.S. Cl. D22—137



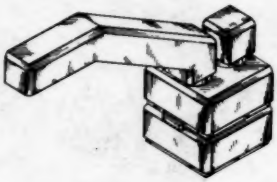
291,472
REEL FOR FISHING
Yasuhisa Kameda, Saitama, Japan, assignor to Daiwa Seiko, Inc., Japan
Filed Jun. 21, 1984, Ser. No. 623,097
Claims priority, application Japan, Dec. 23, 1983, 58-55506
Term of patent 14 years
U.S. Cl. D22—141

291,473
FISHING REEL
Hideo Nakamura, Tokyo, Japan, assignor to Daiwa Seiko, Inc., Japan
Filed Nov. 28, 1984, Ser. No. 675,667
Claims priority, application Japan, May 28, 1984, 59-21703
Term of patent 14 years
U.S. Cl. D22—140

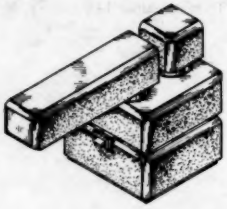
291,474
MUZZLE LOADER
Melvin W. Scheuring, 18053 Bennett Rd., North Royalton, Ohio 44133
Filed Aug. 30, 1984, Ser. No. 645,793
Term of patent 14 years
U.S. Cl. D22—199



291,475
FAUCET
Stephen O. Gregory, 2502 Arapahoe St., Denver, Colo. 80205
Filed Oct. 8, 1985, Ser. No. 785,883
Term of patent 14 years
U.S. Cl. D23—23

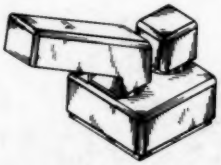


291,476
FAUCET
Stephen O. Gregory, 2502 Arapahoe St., Denver, Colo. 80205
Filed Oct. 8, 1985, Ser. No. 785,884
Term of patent 14 years
U.S. Cl. D23—23

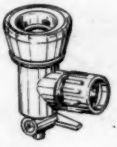


291,477
FAUCET KNOB
Bethany Lathrop, Los Angeles, Calif., assignor to Aloys F. Dornbracht GmbH & Co., Iserlohn, Fed. Rep. of Germany
Filed Oct. 18, 1985, Ser. No. 789,061
Claims priority, application Fed. Rep. of Germany, Apr. 19, 1985, MR 7435
Term of patent 14 years
U.S. Cl. D23—28

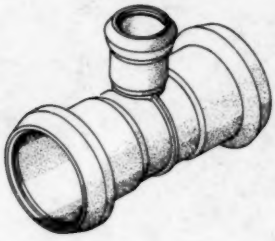
291,478
SPOUT
Stephen O. Gregory, 2502 Arapahoe St., Denver, Colo. 80205
Filed Oct. 8, 1985, Ser. No. 785,885
Term of patent 14 years
U.S. Cl. D23—32



291,479
QUICK-DISCONNECT FITTING OR SIMILAR ARTICLE
James M. Padilla, Covina, and Sigfrid A. Tomchak, Fountain Valley, both of Calif., assignors to Cuno Incorporated, Meriden, Conn.
Filed Jul. 19, 1984, Ser. No. 632,568
Term of patent 14 years
U.S. Cl. D23—43

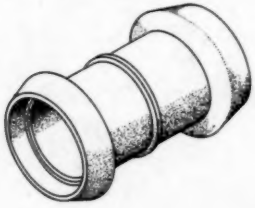


291,480
TEE PIPE FITTING
Efrain D. Vassallo, and Jose E. Valls, both of Ponce, P.R., assignors to Vassallo Research and Development Corporation, Ponce, P.R.
Filed Jan. 31, 1985, Ser. No. 697,069
Term of patent 14 years
U.S. Cl. D23—45

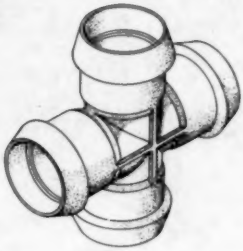


291,481
ELBOW PIPE FITTING
Efrain D. Vassallo, and Jose E. Valls, both of Ponce, P.R., assignors to Vassallo Research and Development Corporation, Ponce, P.R.
Filed Feb. 11, 1985, Ser. No. 700,138
Term of patent 14 years
U.S. Cl. D23—43

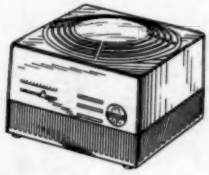
291,482
PIPE COUPLING
Efrain D. Vassallo, and Jose E. Valls, both of Ponce, P.R., assignors to Vassallo Research and Development Corporation, Ponce, P.R.
Filed Mar. 13, 1985, Ser. No. 711,107
Term of patent 14 years
U.S. Cl. D23—45



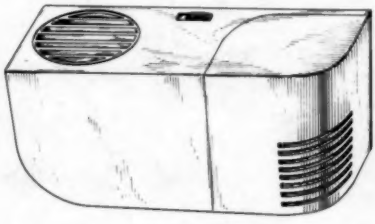
291,483
CROSS TEE PIPE FITTING
Efrain D. Vassallo, and Jose E. Valls, both of Ponce, P.R., assignors to Vassallo Research and Development Corporation, Ponce, P.R.
Filed Mar. 13, 1985, Ser. No. 711,108
Term of patent 14 years
U.S. Cl. D23—45



291,484
AIR PURIFIER
Franz A. Stützer, and Joachim Grützke, both of Offenbach am Main, Fed. Rep. of Germany, assignors to Rowenta-Werke GmbH, Fed. Rep. of Germany
Filed Mar. 11, 1985, Ser. No. 710,019
Claims priority, application Fed. Rep. of Germany, Sep. 14, 1984, 5 MR 10 554
Term of patent 14 years
U.S. Cl. D23—150

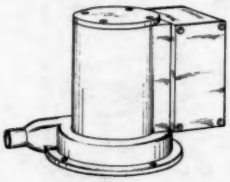


291,485
COMBINED AIR FRESHENER AND REFILL CARTRIDGE
Richard O. Norman, and John R. Frassanito, both of San Antonio, Tex., assignors to Sani-Fresh International, Inc., San Antonio, Tex.
Filed Sep. 20, 1985, Ser. No. 778,555
Term of patent 14 years
U.S. Cl. D23—150

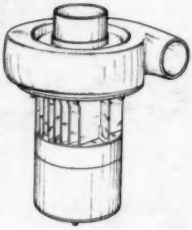


291,486
ELECTRIC FAN
Shuichi Kouno, Tokorozawa; Hideki Sakae, Hino; Kazunori Yanagisawa, Yamato, and Yasuo Tsumurai, Higashi Kanesawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Dec. 26, 1985, Ser. No. 813,628
Claims priority, application Japan, Aug. 14, 1985, 60-34561
Term of patent 14 years
U.S. Cl. D23—155

291,487
INDUSTRIAL FAN
Jacques Delmas, Quaincy/Senart, France, assignor to Etudes Techniques et Representations Industrielles ETRI, Neuilly sur Seine, France
Filed Jun. 19, 1985, Ser. No. 746,581
Claims priority, application France, Feb. 1, 1985, 850434
Term of patent 14 years
U.S. Cl. D23—162

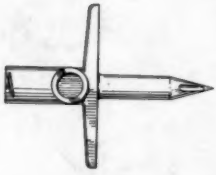


291,488
INDUSTRIAL FAN
Jacques Delmas, Quaincy/Senart, France, assignor to Etudes Techniques et Representations Industrielles ETRI, Neuilly sur Seine, France
Filed Jun. 19, 1985, Ser. No. 746,582
Claims priority, application France, Feb. 1, 1985, 850434
Term of patent 14 years
U.S. Cl. D23—162



291,489
AMPOULE BREAKER
Edward Dudnyk, 444 Lakeside Dr., Horsham, Pa. 19044
Filed Jun. 27, 1984, Ser. No. 625,330
Term of patent 14 years
U.S. Cl. D24—8

291,490
VENTED PIERCING PIN FOR I.V. CONTAINERS
Kenneth C. Raines, Bethlehem, Pa., assignor to Burron Medical Inc., Bethlehem, Pa.
Filed Dec. 13, 1984, Ser. No. 681,304
Term of patent 14 years
U.S. Cl. D24—52



291,491
FLEXIBLE I.V. CONTAINER
Mark E. Larkin, Lindenhurst, Ill., assignor to Abbott Laboratories, North Chicago, Ill.
Filed Dec. 10, 1984, Ser. No. 680,015
Term of patent 14 years
U.S. Cl. D24—58

291,492
BALUSTER
John B. Noyce, Grosse Ile, Mich., assignor to Manufacturer's Merchandising Corporation, Grosse Ile, Mich.
Filed Sep. 17, 1984, Ser. No. 651,455
Term of patent 14 years
U.S. Cl. D25—77

291,493
ULTRA-THIN CIGARETTE LIGHTER
Robert A. Endelson, 330 E. 79th St., New York, N.Y. 10021
Filed May 24, 1985, Ser. No. 737,473
Term of patent 14 years
U.S. Cl. D27—36

291,494
CIGARETTE LIGHTER
Yoshio Hirota, Asakusabashi, Japan, assignor to Kabushiki Kaisha Hirota, Japan
Filed Jul. 9, 1985, Ser. No. 753,086
Claims priority, application Fed. Rep. of Germany, May 1, 1985, 17674
Term of patent 14 years
U.S. Cl. D27—40

291,495
SAFETY RAZOR CARTRIDGE
John T. Ciaffone, Bridgeport, Conn., assignor to Warner-Lambert Company, Morris Plains, N.J.
Filed Nov. 23, 1984, Ser. No. 674,211
Term of patent 14 years
U.S. Cl. D28—47

291,496
DRY SHAVER
Klaas T. Oord, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Feb. 20, 1985, Ser. No. 703,244
Claims priority, application Benelux, Aug. 23, 1984, 52981-02
Term of patent 14 years
U.S. Cl. D28—50

291,497
DRY SHAVER
Klaas T. Oord, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Feb. 20, 1985, Ser. No. 703,245
Claims priority, application Benelux, Aug. 23, 1984, 52981-01
Term of patent 14 years
U.S. Cl. D28—50

291,498
DRY SHAVER
Klaas T. Oord, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Feb. 20, 1985, Ser. No. 703,246
Claims priority, application Benelux, Aug. 23, 1984, 52981-04
Term of patent 14 years
U.S. Cl. D28—50

291,499
DRY SHAVER
Klaas T. Oord, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Mar. 4, 1985, Ser. No. 708,196
Claims priority, application United Kingdom, Oct. 6, 1984, 1.022.489
Term of patent 14 years
U.S. Cl. D28—50

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 18TH DAY OF AUGUST, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Ahlstrom Osakeyhtio: *See*—
Sundman, Frey, 4,687,146, Cl. 241-79.300.

A. B. Chance Company: *See*—
Beard, Lloyd R., 4,688,143, Cl. 361-335.000.

A. Natterman & Cie, GmbH: *See*—
Wendel, Armin; Leyck, Sigurd; Wetzig, Helmut; Hager, Jorg; Durr, Manfred; and Ghyczy, Miklos, 4,687,766, Cl. 514-78.000.

A. W. Showell (Surgicraft) Limited: *See*—
Dove, John; and Showell, Anthony D., 4,686,970, Cl. 128-92.0YM.

Aagano, Toshitaka; and Takasaki, Yoshimi, to Fuji Photo Film Co., Ltd. Residual image erasure control using photomultiplier bleeder resistor voltage. 4,687,937, Cl. 250-484.100.

Aaltonen, Jarmo: *See*—
Kari, Esko T.; Aaltonen, Jarmo; and Suokas, Elias U., 4,687,571, Cl. 209-167.000.

AB Innomatic: *See*—
Eriksson, Rune, 4,687,986, Cl. 324-71.100.

AB Volvo: *See*—
Stillback, Ola, 4,687,172, Cl. 248-551.000.

Abar Ipsen Industries: *See*—
Berk, Michael A., 4,688,039, Cl. 340-870.170.

Abbott Laboratories: *See*—
Chu, Daniel T., 4,687,770, Cl. 514-211.000.
Pumphrey, John G.; and Shanks, Robert E., 4,687,336, Cl. 356-436.000.
Schultz, Steven G., 4,687,329, Cl. 356-328.000.

Abbott, Vaughan: *See*—
Douglas, Robert J.; Doughty, Robert L.; Mungovan, John P.; Andersen, Robert P.; and Abbott, Vaughan, 4,687,502, Cl. 65-164.000.

Abe, Takao: *See*—
Takano, Yoshiya; Hoshi, Yoshikazu; Abe, Takao; and Tomozaki, Ryozoo, 4,687,425, Cl. 417-462.000.

Abiko, Takashi, to Kabushiki Kaisha Toshiba. Data demodulation apparatus. 4,688,205, Cl. 369-59.000.

Aboud, Isaac: *See*—
Marston, Stephen; and Aboud, Isaac, 4,686,710, Cl. 2-2.000.

Abrahamson, Donald W.: *See*—
Solomon, Frank; Grun, Charles; Abrahamson, Donald W.; Stewart, James J.; and Niksa, Marilyn J., 4,687,553, Cl. 204-16.000.

Acheson, Rees. Automatic welding apparatus for weld build-up and method of achieving weld build-up. 4,687,899, Cl. 219-76.140.

Achiha, Masahiko, to Hitachi, Ltd. Movement detection circuit for television signals. 4,688,084, Cl. 358-36.000.

ADAC E.V.: *See*—
Klanner, Wilfried; Schmaler, Dieter H.; Wetter, Hermann; Felsch, Bernhard; and Czernakowski, Waldemar, 4,687,255, Cl. 297-488.000.

Adachi, Hisanobu: *See*—
Suzaki, Shunkichi; Shirai, Toshiaki; Adachi, Hisanobu; Hayashi, Masaharu; Hattori, Kenji; and Takakura, Yoshinari, 4,687,132, Cl. 236-35.000.

Adair, Paul C.: *See*—
Wright, Richard F.; Adair, Paul C.; and Sanders, Frederick W., 4,687,725, Cl. 430-138.000.

Adams, Ronald F.: *See*—
Weil, David M.; Lieberman, Burton E.; and Adams, Ronald F., 4,687,698, Cl. 428-209.000.

Adams, Victor J.; and Derrington, Carl E., to Motorola, Inc. Membrane protected pressure sensor. 4,686,764, Cl. 29-592.000.

Adelstein, Gilbert W.; Moormann, Alan E.; and Yu, Stella S. T., to G. D. Searle & Co. 2-[(Imidazo[1,2-a]pyridinylmethyl)sulfinyl]-1H-benzimidazoles. 4,687,775, Cl. 514-300.000.

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Galvin, Aaron A.; Mason, Douglas L.; Leff, Kenneth J.; Schide, John N.; and Giffone, Ralph A., 4,687,924, Cl. 250-216.000.

Advanced Manufacturing Systems, Inc.: *See*—
Marshall, James W.; Haaser, Michael J.; Vanicky, Alex A.; and Podhorniak, Gary S., 4,687,093, Cl. 198-465.200.

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Thomas, Mammen; and Weinberg, Matthew, 4,686,763, Cl. 437-51.000.
Varadarajan, Hemmige D., 4,687,953, Cl. 307-270.000.

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Cavasa, Victor; and Fontaine, Jean-Marc, 4,686,825, Cl. 60-243.000.

Agarwal, Arun K., to Wang Laboratories, Inc. Screen manager for data processing system. 4,688,167, Cl. 364-200.000.

Agency of Industrial Science & Technology, Ministry of International Trade & Industry: *See*—
Okazaki, Susumu; Higuchi, Shunichi; Nakamura, Osamu; and Takahashi, Sachio, 4,687,996, Cl. 324-436.000.

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Brinkmeyer, Hermann; Hubler, Gerhard; Perrey, Hermann; Nippe, Burkhard; and Kober, Heinrich, 4,687,709, Cl. 428-425.900.
Reuter, Karl-Heinz; and Meckl, Heinz, 4,687,577, Cl. 210-288.000.

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Aguirregomezcorta, Enrique. Base ball game. 4,687,199, Cl. 273-93.00R.

Aigner, Friedrich, to Steyr-Daimler-Puch AG. Mechanical aiming device for rifles. 4,686,770, Cl. 33-257.000.

Aikawa, Takeshi: *See*—
Saito, Mitsuo; Aikawa, Takeshi; and Mori, Akio, 4,688,032, Cl. 340-799.000.

Air Products and Chemicals, Inc.: *See*—
Goodell, Paul D.; Huston, Ernest L.; Rudman, Peter S.; and Sandrock, Gary D., 4,687,650, Cl. 423-248.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Kazaoka, Kenichi; Okazaki, Hiroshi; and Inaba, Yasuhisa, 4,687,251, Cl. 297-337.000.
Kobayashi, Hideyuki, 4,686,871, Cl. 74-866.000.
Suzaki, Shunkichi; Shirai, Toshiaki; Adachi, Hisanobu; Hayashi, Masaharu; Hattori, Kenji; and Takakura, Yoshinari, 4,687,132, Cl. 236-35.000.

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Ballschuh, Detlef; Seibt, Horst; Rusche, Jochen; and Ohme, Roland, 4,687,602, Cl. 260-501.120.

Akama, Masato: *See*—
Ehara, Shunji; Nakamura, Shuji; and Akama, Masato, 4,687,832, Cl. 528-97.000.

Akao, Mutsuo, to Fuji Photo Film Co., Ltd. Packaging material for photosensitive materials. 4,687,692, Cl. 428-137.000.

Akashah, Saed-el-Deen: *See*—
Lahalih, Shawqui; Akashah, Saed-el-Deen; and Al-Hajjar, Farouk, 4,686,790, Cl. 47-9.000.

Akeda, Yasuhiro: *See*—
Ogata, Hajime; Nakakouji, Hisatada; Akeda, Yasuhiro; Ichida, Toshio; Irie, Toshio; and Otsuka, Sachiko, 4,687,713, Cl. 428-628.000.

Akesson, Yngve R., to Nestec S.A. Continuous mixing process. 4,687,674, Cl. 426-549.000.

Akiyama, Seikichi: *See*—
Ishii, Mitsuru; Akiyama, Seikichi; and Ishibashi, Hiroyuki, 4,687,683, Cl. 427-160.000.

Akiyama, Toru, to Pioneer Electronic Corporation. Apparatus for the color synchronization of reproduced video signals. 4,688,103, Cl. 358-326.000.

Akzo nv: *See*—
Zeilstra, Jacobus J.; and Brink, Ted, 4,687,835, Cl. 528-300.000.

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Alcan International Limited: *See*—
Daglish, Alan R.; Foster, Mark H.; and Marwick, William F., 4,687,587, Cl. 252-11.000.
Furneaux, Robin C.; Rigby, William R.; and Davidson, Alexander P., 4,687,551, Cl. 204-11.000.

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Stokoe, Philip T.; and Boulais, Dennis R., 4,687,887, Cl. 200-16.00F.

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Williams, Rodger W.; and Morgan, Larry J., 4,686,980, Cl. 128-303.130.

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Aldridge, Fredrick A., to General Motors Corporation. Integrated AM-FM mixer. 4,688,263, Cl. 455-142.000.

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Reinartz, Hans D.; and Steffes, Helmut, 4,687,259, Cl. 303-114.000.

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Lasberg, Ingo; and Druckenbrodt, Wolf-Gunther, 4,687,941, Cl. 250-506.100.
Allain, Raymond J.; Bolduc, Henry P., Jr.; Patterson, Thomas R.; and Ingram, Timothy J., to Precision Engineered Systems Inc. Automatic blanket wash system. 4,686,902, Cl. 101-424.000.
Allen, Stephen L.: *See*—
Sylling, Truman V.; and Allen, Stephen L., 4,687,505, Cl. 71-27.000.
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Cordova, David S.; Rowan, Hugh H.; and Lin, Leroy C., 4,687,796, Cl. 523-466.000.
Dunkle, Steven R.; and Haylock, John C., 4,687,795, Cl. 523-436.000.
Margolin, Mark; Moore, James E.; and Grois, Igor, 4,687,288, Cl. 350-96.200.
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Selim, Ahmed E.; and Weilbacker, Thomas O., 4,688,171, Cl. 364-200.000.
Zwolinski, Leon M.; and Dwyer, Frank J., 4,687,787, Cl. 521-131.000.
Allied Gator, Inc.: *See*—
Ramun, Michael; and Ramun, John, 4,686,767, Cl. 30-134.000.
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Allsop, Ivor J.; Allsop, Michael G.; Allsop, James D.; and Clausen, Eivind, 4,687,094, Cl. 206-44.00R.
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Young, Kenneth P., 4,687,042, Cl. 164-80.000.
Aluminum Company of America: *See*—
DeHart, Dwain L., 4,687,884, Cl. 174-130.000.
Aluminum Company of America & Delta Refractories, Inc.: *See*—
Olivarez, Flavio, Jr.; and Walla, Richard J., 4,687,439, Cl. 432-192.000.
AM General Corporation: *See*—
Sanborn, Steven L.; and Neumeyer, Martin J., 4,686,888, Cl. 89-37.130.
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Sugisawa, Ko; Yamamoto, Masanori; Yasuda, Ataushi; Nomura, Yukihiro; and Amano, Toshio, 4,687,739, Cl. 435-69.000.
Amboss, Kurt, to Hughes Aircraft Company. High voltage feedthrough for ion pump. 4,687,417, Cl. 417-49.000.
AMCA International Corporation: *See*—
Conners, John P., 4,688,191, Cl. 364-900.000.
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Amerchol Corporation: *See*—
Smolin, Martin; and Polovsky, Stuart B., 4,687,843, Cl. 536-18.300.
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Curie, Kevin J.; and Jesse, Jerry F., 4,687,688, Cl. 428-35.000.
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Foley, Henry C.; and O'Toole, Michael P., 4,687,784, Cl. 518-714.000.
American Electronics, Inc.: *See*—
Beaver, Richard C., 4,687,170, Cl. 248-543.000.
American Home Products Corporation: *See*—
Mobilio, Dominick; Demerson, Christopher A.; and Humber, Leslie G., 4,687,860, Cl. 548-439.000.
American Industrial Research, Inc.: *See*—
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American Standard Inc.: *See*—
Haley, Paul F.; Junk, Brian S.; Renaud, Merle A.; and Rentmeester, Paul C., 4,686,834, Cl. 62-209.000.
Helt, Robert W., 4,687,948, Cl. 307-38.000.
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Brendgord, Thomas; and Otte, George E., 4,687,215, Cl. 280-79.10R.
Hall, George D., 4,686,889, Cl. 92-117.00A.
Kaehler, Kristine M.; Krahe, Ronald P.; Miraldi, Peter T.; and McBride, Richard A., 4,687,635, Cl. 422-26.000.
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Banzi, Frederick J., Jr.; Dugan, Michael J.; Johnson, Randolph W.; Saylor, Douglas D.; and Sharper, Craig A., 4,688,209, Cl. 370-15.000.
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American Telephone and Telegraph Company, AT&T Laboratories: *See*—
DeWitt, Gregory S.; Driscoll, John J.; and Shepherd, John L., 4,688,214, Cl. 370-94.000.
American Telephone and Telegraph Company, AT&T Technologies, Inc.: *See*—
Koze, Jeffrey T., 4,687,682, Cl. 427-94.000.
Amoco Corporation: *See*—
Clendinning, Robert A.; and Kwiatkowski, George T., 4,687,833, Cl. 528-125.000.
AMP Incorporated: *See*—
Birch, Norman R.; Pauza, William V.; and Sheesley, Wilmer L., 4,687,446, Cl. 439-553.000.
Cosmos, Pete; Scully, Michael J.; and Stephenson, Brian D., 4,687,263, Cl. 439-108.000.
Dubbs, Jack F.; and Hanyen, Clyde K., 4,686,766, Cl. 29-883.000.
Grabbe, Dimitry; and Korsunsky, Iosif, 4,687,278, Cl. 439-842.000.
Header, Stephen; Moore, Jerry L.; and Taylor, Attalee S., 4,687,267, Cl. 439-62.000.
Shuey, John R., 4,687,264, Cl. 439-92.000.
Smith, Mark L., 4,687,555, Cl. 204-26.000.
Smith, Mark L.; and Wagner, Richard M., 4,687,562, Cl. 204-206.000.
Stape, William J.; and Weber, Robert N., 4,687,291, Cl. 350-96.210.
Ampex Corporation: *See*—
Wagner, Steven D., 4,688,080, Cl. 358-31.000.
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Brinckmann, Paul; and Anapliotis, Emmanuel, 4,687,486, Cl. 623-16.000.
Andersen, Robert P.: *See*—
Douglas, Robert J.; Doughty, Robert L.; Mungovan, John P.; Andersen, Robert P.; and Abbott, Vaughan, 4,687,502, Cl. 65-164.000.
Anderson, Richard N., to Hunter Douglas Inc. Guided cord system for a retractable slatted blind assembly. 4,687,041, Cl. 160-168.00R.
Anderson Strathclyde PLC: *See*—
Gill, Arthur, 4,687,375, Cl. 405-146.000.
Ando, Eizi: *See*—
Hiraiwa, Tadashi; and Ando, Eizi, 4,686,774, Cl. 34-9.000.
Andra, Bryan K.; Funk, Kent D.; Lang, Clyde J.; and Todd, Philip, to Kansas State University Research Foundation. Cylindrical baler having bale-shape-responsive loading control system. 4,686,820, Cl. 56-341.000.
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Passaro, Robert E.; Rogers, Raymond E.; and Griffith, Craig J., 4,687,934, Cl. 250-343.000.
Angeles, Purita R., to Cooper Industries, Inc. Fiber optic plenum cable. 4,687,294, Cl. 350-96.230.
Angleraud, Rene : *See*—
Malbrancq, Jean-Michel; Bouveret, Elisabeth; and Angleraud, Rene , 4,687,580, Cl. 210-651.000.
Anno, Nobuo; and Arai, Takeo, to Honda Giken Kogyo Kabushiki Kaisha. Closed-deck cylinder block for water-cooled internal combustion engines. 4,686,943, Cl. 123-41.740.
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Braun, Hilarion; Lush, Linda M.; and Antolik, Ralph E., III, 4,688,047, Cl. 346-1.100.
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Aoki, Takashi; Sato, Yoichi; and Fukuda, Yukihiro, to Honda Giken Kogyo Kabushiki Kaisha. Automatic transmission with anti creep device. 4,686,872, Cl. 74-869.000.
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Appel, James J.; Costanza, Daniel W.; and Dastin, Richard M., to Xerox Corporation. Document scanning system with selective edit mode. 4,687,317, Cl. 355-3.00R.
Applied Coatings International, Inc.: *See*—
Beale, Harry A., 4,687,679, Cl. 427-38.000.
Applied Membrane Technology, Inc.: *See*—
Naimon, Errol J.; and Jackson, Michael, 4,686,975, Cl. 128-204.230.
Aqua Systems, Inc.: *See*—
Kinkead, Clifford W.; and Kinkead, David W., 4,686,718, Cl. 4-508.000.
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Anno, Nobuo; and Arai, Takeo, 4,686,943, Cl. 123-41.740.
Arai, Tatsuo: *See*—
Shimomura, Hiroshi; and Arai, Tatsuo, 4,687,383, Cl. 407-46.000.
Aramaki, Yuichiro, to Kabushiki Kaisha Tsukasa Sokken. Air/fuel ratio measuring device. 4,686,846, Cl. 73-23.000.

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Harris, Meade C., Jr.; Miller, David W.; and Arciszewski, Henry E., 4,687,673, Cl. 426-549.000.
Ardal OG Sunndal Verk A.S.: *See—*
Berg, Otto, 4,687,524, Cl. 148-11.50A.
Argabright, Perry A.; and Rhudy, John S., to Marathon Oil Company. Oil recovery process and system. 4,687,586, Cl. 252-8.551.
Ariga, Susumu, to Sanshin Kogyo Kabushiki Kaisha. Turbulence generator for two-stroke spark-assisted diesel engines. 4,686,941, Cl. 123-26.000.
Arika, Junji; Igawa, Kazushige; and Itabashi, Keiji, to Toyo Soda Manufacturing Co., Ltd. Process for preparation of zeolite OE having an offretite type structure. 4,687,653, Cl. 423-329.000.
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Arko, Robert J., to United States of America, Health and Human Services. Subcutaneous fluid and culture chamber and implant technique. 4,687,001, Cl. 128-767.000.
Arndt, Jentzsch; Schumann, Guenter; and Stellmacher, Wolfgang, to VEB Kombinat Polygraph "Werner Lamberz" Leipzig. Method and device for removing spots from a printing plate. 4,686,901, Cl. 101-148.000.
Arnold, Allan J. Auxiliary handle for a door. 4,686,742, Cl. 16-112.000.
Arnold, George D. M.: *See—*
Thoma, Christian H.; and Arnold, George D. M., 4,686,829, Cl. 60-464.000.
Arnold, Herbert S.: *See—*
Sugam, Richard J.; and Arnold, Herbert S., 4,686,853, Cl. 73-61.200.
Arnold, Peter: *See—*
Hunold, Klaus; Lipp, Alfred; Reinmuth, Klaus; Arnold, Peter; and Napholcz, Johannes, 4,687,655, Cl. 423-344.000.
Arns, James A.: *See—*
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Asahi Glass Company Ltd.: *See—*
Matsuo, Masashi; Yamagishi, Nobuyuki; Noshiro, Makoto; Jitsugiri, Yukio; and Ohnishi, Keiichi, 4,687,707, Cl. 428-336.000.
Asahi, Morio: *See—*
Aoshima, Terutaka; Asahi, Morio; Imai, Masahiro; and Narita, Ryuuho, 4,687,910, Cl. 219-506.000.
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Ascher, Gilles: *See—*
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ASEA Aktiebolag: *See—*
Hjortsberg, Arne; Holmstrom, Goran; and Osterlund, Erik, 4,688,142, Cl. 361-332.000.
Ashland Oil, Inc.: *See—*
Walters, Paul W.; and Peppard, A. V., 4,687,492, Cl. 55-1.000.
Ashton, Mark; and Hounsfield, Godfrey N., to EMI Limited. Control system for a robotic gripper. 4,687,979, Cl. 318-638.000.
Ashworth, Denis H., to Simon Engineering Dudley Limited. Hydraulically elevatable access equipment. 4,687,073, Cl. 182-2.000.
Association Suisse pour la Recherches Horlogere: *See—*
Hintermann, Hans-Erich, 4,687,487, Cl. 623-18.000.
Astley, George W., to Canadian National Railway Company. Remote control system for a locomotive. 4,687,258, Cl. 303-3.000.
Atkin, Howard S., to Dunlop Limited. Tracks for track-laying vehicles. 4,687,261, Cl. 305-57.000.
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Heaton, Harley L., III; Lippold, Joseph H., Jr.; McHale, Edward T.; and Skolnik, Edward G., 4,687,490, Cl. 44-51.000.
Atlantic Richfield Company: *See—*
Pathak, Prabodh; Salter, Stephen J.; Gonzalez, Jay A.; and Perkins, Thomas K., 4,687,059, Cl. 166-271.000.
Shum, Wilfred P.; and Cooper, Charles F., 4,687,868, Cl. 556-57.000.
Zupanick, Joseph E.; and Braun, Clarence, 4,687,335, Cl. 356-416.000.
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Kajihara, Takehiro; Atsumi, Senji; and Izumiya, Hirotsugu, 4,687,969, Cl. 313-625.000.
Aul, George N.: *See—*
Richards, Walter L.; Henderson, Roger L.; Aul, George N.; and Pauley, Barry W., 4,687,060, Cl. 166-285.000.
Aurichio, Joseph A.: *See—*
Sheyon, Gregory M.; and Aurichio, Joseph A., 4,687,693, Cl. 428-148.000.
Australian Transcenders International Pty. Ltd.: *See—*
Pagett, Jeffery M., 4,687,068, Cl. 180-8.200.
Autelca AG.: *See—*
Ramseier, Hans, 4,687,090, Cl. 194-317.000.
Wuethrich, Werner, 4,687,089, Cl. 194-230.000.
Automotive Products plc: *See—*
Leigh-Monstevens, Keith V.; Wrobleski, David L.; Nix, Richard A.; and Rei, Mark W., 4,687,084, Cl. 192-85.0CA.
Ward, Christopher G., 4,687,086, Cl. 192-106.200.
Autotrol Corporation: *See—*
Goudy, Paul R., Jr.; Weekley, William G.; Dovala, Donald L.; and Olszewski, Thomas C., Sr., 4,687,031, Cl. 141-9.000.
Avantek, Inc.: *See—*
Kipnis, Issy, 4,688,005, Cl. 331-117.00R.
Axlon, Inc.: *See—*
Milner, Ronald E., 4,687,457, Cl. 446-175.000.
Ayata, Naoki: *See—*
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B. F. Goodrich Company, The: *See—*
Kageorge, Pedro W., 4,687,159, Cl. 244-134.00A.
Schaffner, Donald R.; and Leeds, Donald H., 4,688,239, Cl. 378-141.000.
Son, Pyong-Nae; and Jacobs, Charles P., 4,687,850, Cl. 544-384.000.
Baba, Fumiaki: *See—*
Mitani, Tetsuo; Baba, Fumiaki; and Inaka, Katsuyoshi, 4,687,801, Cl. 524-104.000.
Babcock-Hitachi Kabushiki Kaisha: *See—*
Kuroda, Hiroshi; Nishimura, Tsukasa; Nishimura, Masakatsu; Hashimoto, Taiki; Kanda, Osamu; Nozawa, Shigeru; and Shibata, Kenji, 4,687,649, Cl. 423-242.000.
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Dougan, Donald R.; Peters, Gerald W.; and Kish, William C., 4,687,145, Cl. 241-57.000.
Stockmaster, Edward F., 4,687,276, Cl. 439-557.000.
Babel, Werner, to MAHO Aktiengesellschaft. Cubicle for machining centers. 4,687,088, Cl. 192-133.000.
Babendererde, Siegmund; Hillemeier, Bernd; and Braach, Otto, to Hochtief Aktiengesellschaft Vorm. Gebr. Helfmann. Method of and apparatus for concrete tunnel lining. 4,687,374, Cl. 405-146.000.
Bachelard, Roland; and Joubert, Philippe, to Comurhex. Process for the preparation of pulverulent metallic oxides from metallic nitrates. 4,687,601, Cl. 252-638.000.
Bai, Monty W., to Motorola, Inc. Apparatus and method of safe and arming munitions. 4,686,885, Cl. 89-6.500.
Baik, Haeng J., to Gold Star Co., Ltd. 100 Volt/220 volt compatible electromagnetic induction heating cooker. 4,687,896, Cl. 219-10.770.
Bakdahl, Samuel. Worm drive clips. 4,686,747, Cl. 24-274.00R.
Baker, Richard W.; and Brooke, James W., to Burroughs Wellcome Co. Pharmaceutical delivery system. 4,687,660, Cl. 424-465.000.
Bakhaus, Kenneth C.; and Sdunek, Bruce C., to Mechanical Products, Inc. Snap-in bushing. 4,687,164, Cl. 248-27.300.
Bakkila, Charles A.; and Warrick, Frederick P. Safety mask. 4,686,976, Cl. 128-206.150.
Balagot, Reuben C.: *See—*
Ehrenpreis, Seymour; Comaty, Joseph E.; and Balagot, Reuben C., 4,687,781, Cl. 514-557.000.
Baldessarini, Ross J.: *See—*
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Ball, James. Adjusting device for a slat blind. 4,687,040, Cl. 160-107.000.
Ballschuh, Detlef; Seibt, Horst; Rusche, Jochen; and Ohme, Roland, to Akademie der Wissenschaften der DDR. Novel 2-substituted 3-sulfopropyl-ammonium betaines and processes for making same. 4,687,602, Cl. 260-501.120.
Banasiak, Dennis S.; Mozdzen, Edward C.; and Byers, Jim D., to Phillips Petroleum Company. Metallotetradecadiene compounds. 4,687,867, Cl. 556-52.000.
Bandai, Yasuhito: *See—*
Igi, Hisashi; Ohta, Eiichi; Bandai, Yasuhito; and Takagi, Kazuhiko, 4,687,352, Cl. 400-73.000.
Banzi, Frederick J., Jr.; Dugan, Michael J.; Johnson, Randolph W.; Saylor, Douglas D.; and Sharper, Craig A., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Method and apparatus for looping around a digital transmission line at a channel unit. 4,688,209, Cl. 370-15.000.
Baraw Corporation: *See—*
Timpson, Alma A., Jr.; and Rachal, Richard N., 4,687,212, Cl. 277-205.000.
Bareket, Noah, to Lockheed Missiles & Space Company, Inc. Self-referencing scan-shear interferometer. 4,687,332, Cl. 356-353.000.
Bargain, Raymond: *See—*
Dubertret, Alain; Rizzo, Gilles; Bargain, Raymond; De Mendez, Michel; and Thenaisie, Jacky, 4,687,269, Cl. 439-161.000.
Barkatt, Aaron: *See—*
Macedo, Pedro B.; Barkatt, Aaron; and Sutter, Herbert G., 4,687,581, Cl. 210-670.000.
Barker, John L., Jr.: *See—*
Barker, John L., Sr.; and Barker, John L., Jr., 4,687,101, Cl. 206-444.000.
Barker, John L., Sr.; and Barker, John L., Jr. Disk protector/holder. 4,687,101, Cl. 206-444.000.
Barkley, Vincent P.; and Siegel, William J., to PACE, Incorporated. Heater device. 4,687,907, Cl. 219-373.000.
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Barnard, Christopher F. J., to Johnson Matthey PLC. Anti-tumor compounds of platinum. 4,687,780, Cl. 514-492.000.
Barnes-Hind, Inc.: *See—*
Lim, Drahoslav; Jacoby, Stephen; Homick, Richard; and Powers, Frank, 4,687,485, Cl. 623-6.000.
Barrus, Gordon B.; and Emenaker, Leo J., to Printronix, Inc. Color printer. 4,687,359, Cl. 400-218.000.
Barry Wright Corporation: *See—*
Pardo, Jacob; and Jensen, William S., 4,687,127, Cl. 277-12.000.

Bartels, Mark A.: *See*—
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Bartelt, John L.: *See*—
Ward, J. William; Bartelt, John L.; Seliger, Robert L.; and McKenna, Charles M., 4,687,940, Cl. 250-492.200.

Bartley, William J.; and von Dohlen, Werner C., deceased (by von Dohlen, Helga E., executrix), to Union Carbide Corporation. Process for dimerization. 4,687,877, Cl. 585-516.000.

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Bartolo, William; De Robertis, Patrick; and Vanzetto, Daniel, to Merlin Gerin. Fast manual closing mechanism of a miniature circuit breaker. 4,687,891, Cl. 200-153.00G.

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Brunnmueller, Fritz; and Kroener, Michael, 4,687,848, Cl. 544-336.000.
Grimmer, Johannes; and Horn, Hans C., 4,687,847, Cl. 544-251.000.
Gruehn, Dietrich; Fehrenbach, Hubert; and Holl, Norbert, 4,688,129, Cl. 360-133.000.
Lenz, Werner; Sander, Hans; and Moeller, Dieter, 4,687,813, Cl. 525-131.000.
Schoettle, Klaus; Buhk, Artur; Kamm, Eugen; Berger, Heinz; and Gaiser, Dieter, 4,687,157, Cl. 242-199.000.

BASF Corporation: *See*—
Alford, Robert A.; and Braemer, Mark C., 4,687,534, Cl. 156-308.600.

Batson, David M.: *See*—
Cellier, Francis; Graulty, Robert T.; Johnson, Wendell L.; Batson, David M.; Limpert, John C.; Wu, Christopher K. C.; Bucher, George D.; John, Clarence D., Jr.; Steinkirchner, John E.; Larouere, Paula J.; Shah, Hemant H.; and Williams, Robert A., 4,687,605, Cl. 264-0.500.

Batzar, Kenneth, to Du Pont de Nemours, E. I., and Company. High build fluorocarbon polymer dispersions and their preparation. 4,687,708, Cl. 428-339.000.

Bauck, Jerald L., to Motorola, Inc. Method for determining the direction of a radiation source. 4,687,923, Cl. 250-203.00R.

Baumert, Heinz; Schmitt-Maass, Nikolaus; and Karb, Erich, to Daimler-Benz Aktiengesellschaft. Belt lock arranged recessed in a pocket of a seat part. 4,687,254, Cl. 297-481.000.

Baxter Travenol Laboratories, Inc.: *See*—
Elbert, Lawrence E., 4,687,962, Cl. 310-316.000.

Bayer Aktiengesellschaft: *See*—
Weber, Karl-Arnold; Buysch, Hans-Josef; Noble, Karl-Ludwig; and Traubel, Harro, 4,687,830, Cl. 528-64.000.

Bayer, Karl: *See*—
Andra, Wolfhart; Bayer, Karl; Beyer, Erwin; and Andra, Hans-Peter, 4,687,182, Cl. 254-93.00R.

Bazilio, Rayman E.: *See*—
Hartz, James F.; Bazilio, Rayman E.; and Ferguson, Michael R., 4,687,071, Cl. 180-9.100.

BBC Aktiengesellschaft Brown, Boveri & Cie: *See*—
Dustmann, Cord-Henrich, 4,688,132, Cl. 361-19.000.

BBC Brown, Boveri & Company Limited: *See*—
Frutschi, Hansulrich, 4,686,822, Cl. 60-39.020.

BDC Electronics: *See*—
Buck, Robert H.; Cowan, Kent G.; Doughty, John P.; and Marshall, Stephen E., 4,688,021, Cl. 340-521.000.

Beale, Harry A., to Applied Coatings International, Inc. Method of coating a substrate. 4,687,679, Cl. 427-38.000.

Beall, George H., to Corning Glass Works. Refractory glass-ceramics containing enstatite. 4,687,749, Cl. 501-5.000.

Beard, Lloyd R., to A. B. Chance Company. Fuse well and housing for pad-mounted, double fused switchgear. 4,688,143, Cl. 361-335.000.

Beaver, Richard C., to American Electronics, Inc. Camera mounting bracket. 4,687,170, Cl. 248-543.000.

Bechtolsheim, Andreas, to Sun Microsystems, Inc. High speed frame buffer refresh apparatus and method. 4,688,190, Cl. 364-900.000.

Beckman Instruments, Inc.: *See*—
Sharples, Thomas D., 4,686,752, Cl. 29-163.50R.

Becor Western Inc.: *See*—
Gilanyi, Frank, 4,687,401, Cl. 414-22.000.
Lang, David M.; and Lewitzke, Richard W., 4,686,873, Cl. 81-57.350.

Bedford, Peter H. Support pad for nonambulatory persons. 4,686,724, Cl. 5-468.000.

Beecham Group p.l.c.: *See*—
Evans, John M., 4,687,779, Cl. 514-456.000.

Beeler Mfg. Co.: *See*—
Beeler, Robert J., 4,687,130, Cl. 229-114.000.

Beeler, Robert J., to Beeler Mfg. Co. Disposable ice and beverage container. 4,687,130, Cl. 229-114.000.

Beg, Mirza R.; Perl, Julius; and Malcolm, Ronald D., Jr., to Image Technology Incorporated. Programmable image-transformation system. 4,688,095, Cl. 358-160.000.

Beghetto, Leonardo; and Padovan, Giovanni, to Technomare S.p.A. Undersea template for the drilling of wells for the exploitation of hydrocarbon pools under the sea. 4,687,062, Cl. 166-366.000.

Beglinger, Gregory O., to Phillips Plastics Corporation. Apparatus for molding two-piece plastic fastener. 4,687,434, Cl. 425-556.000.

Beim, Rudolf, to Ford Motor Company. Ratio change gear speed synchronizing in a tractor transmission. 4,686,869, Cl. 74-745.000.

Beinert, Gerard: *See*—
Chaumont, Philippe; Beinert, Gerard; Herz, Jean; and Rempp, Paul, 4,687,814, Cl. 525-242.000.

Bell-Northern Research Ltd.: *See*—
Lukas, Helmut H.; and Pacey, Grant K., 4,687,287, Cl. 350-96.200.

Bell, Robert L.; and Secord, Tyrone R., to Fisher Dynamics Corporation. Seat recliner mechanism with spring coil actuator and redundant positioning. 4,687,252, Cl. 297-374.000.

Bellapadrona, Silvano. Oleopneumatic suspension for vehicles, suitable in particular for motorcycles. 4,687,187, Cl. 267-64.180.

Bellussi, Giuseppe: *See*—
Taramasso, Marco, deceased; Notari, Bruno; Manara, Giovanni; and Bellussi, Giuseppe, 4,687,654, Cl. 423-329.000.

Beloit Corporation: *See*—
Cooke, Ronald D., 4,686,777, Cl. 34-116.000.

Benajam, Alain C. A. Device for detecting and quantifying agglutinates. 4,687,638, Cl. 422-73.000.

Bender, Bruno. Wind turbine frame. 4,687,415, Cl. 416-196.00A.

Bendett, Raymond: *See*—
Beveventano, Thomas; Rosen, Frank L.; Wolff, Richard H.; and Bendett, Raymond, 4,686,771, Cl. 33-324.000.

Benedict, James J.; and Johnson, Karen Y., to Procter & Gamble Company, The. Certain hexahydroindan-2,2-diphosphonic acids useful in treating diseases associated with abnormal calcium and phosphate metabolism. 4,687,768, Cl. 514-102.000.

Benn, Marvin: *See*—
Giammarese, Victor, 4,688,038, Cl. 340-870.020.

Bennett, Mark A., to Kelley Company Inc. Molded high impact industrial door. 4,686,806, Cl. 52-309.400.

Benson, David K.: *See*—
Tracy, C. Edwin; Benson, David K.; and Ruth, Marta R., 4,687,560, Cl. 204-164.000.

Bentley, Arthur. Sonic pressure wave pump with liquid heating and elevating mechanism. 4,687,420, Cl. 417-240.000.

Benz, Wilheim: *See*—
Kotitschke, Gerhard; and Benz, Wilheim, 4,686,778, Cl. 34-117.000.

Berecz, Imre, to Microdot Inc. Composite rivet with deformable plastic locking ring. 4,687,394, Cl. 411-361.000.

Berecz, Imre; and Hinton, Dennis L., to Microdot Inc. Composite rivet with deformable annular collar containing randomly chopped fibers. 4,687,395, Cl. 411-361.000.

Berecz, Imre, to Microdot Inc. One-piece composite rivet with deformable head portion and mandrel. 4,687,396, Cl. 411-503.000.

Berecz, Imre, to Microdot Inc. Composite rivet with strippable mandrel. 4,687,397, Cl. 411-503.000.

Berecz, Imre, to Microdot Inc. Composite rivet with collar reinforced with circumferential fibers. 4,687,398, Cl. 411-503.000.

Berg, Lloyd. Conversion of molybdenite to molybdenum dioxide using petroleum or coal tar pitches. 4,687,647, Cl. 423-53.000.

Berg, Otto, to Ardal OG Sunndal Verk A.S. Method of forming to a finished size vehicle wheels made of a heat-treatable aluminum alloy. 4,687,524, Cl. 148-11.50A.

Berger, Abe: *See*—
Russell, David B.; Gitlitz, Melvin H.; Leiner, Howard H.; Khuddus, Mo A.; and Berger, Abe, 4,687,792, Cl. 523-177.000.

Berger, Heinz: *See*—
Schoettle, Klaus; Buhk, Artur; Kamm, Eugen; Berger, Heinz; and Gaiser, Dieter, 4,687,157, Cl. 242-199.000.

Bergman, Werner, to United States of America, Energy. Sintered composite medium and filter. 4,687,579, Cl. 210-347.000.

Berk, Michael A., to Abar Ipsen Industries. Heat-insulated telemetry system for vacuum furnace. 4,688,039, Cl. 340-870.170.

Bernard, Alain M.; Canny, Jean-Paul L.; and Touboul, Pierre L., to Office National d'Etudes et de Recherches Aerospatiales (ONERA). Device for electrostatically suspending a body or sample. 4,688,141, Cl. 361-233.000.

Bernard, Jean; and Mercier, Michel, to Ste Look. Bicycle pedal and shoe fastening combination. 4,686,867, Cl. 74-534.600.

Berscheid, Peter; and Friesdorf, Jakob, to Isover Saint-Gobain "Les Miroirs". Method of and apparatus for lining a pipe insulating shell consisting of mineral fibers with a foil. 4,687,530, Cl. 156-215.000.

Bersin, Richard L., to Emergent Technologies Corporation. Method and apparatus for dry processing of substrates. 4,687,544, Cl. 156-643.000.

Besocke, Karl-Heinz, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Method and vibrating capacitor apparatus for analysis of a substance or of at least one component of a mixture of substances. 4,686,847, Cl. 73-23.000.

Bessone, Mario, to RIV-SKF Officine Di Villar Perosa S.p.A. Sealing assembly particularly for railway axle bearings. 4,687,211, Cl. 277-50.000.

Best, Donald F.: *See*—
Pellet, Regis J.; Best, Donald F.; Long, Gary N.; Rabo, Jule A.; and Wolynic, Edward T., 4,687,754, Cl. 502-65.000.

Betterton, Joseph T.: *See*—
Zeigler, Thornton W., Jr.; Romanczuk, Chris S.; Betterton, Joseph T.; and Glover, Alfred H., 4,686,952, Cl. 123-572.000.

Betzler, Peter; and Mast, Karl-Friedrich, to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V. Thermal radiation measuring system with a radiation measuring device and a shielded reference device. 4,687,342, Cl. 374-32.000.

Beveventano, Thomas; Rosen, Frank L.; Wolff, Richard H.; and Bendett, Raymond, to Allied Corporation. Gyrocompassing apparatus for stationary equipment. 4,686,771, Cl. 33-324.000.

Beyer, Erwin: *See*—
Andra, Wolfhart; Bayer, Karl; Beyer, Erwin; and Andra, Hans-Peter, 4,687,182, Cl. 254-93.00R.

Beyn, Edgar J. Alternation control system having manual current selection capability and voltage dependent cutoff circuit. 4,687,983, Cl. 322-28.000.

Bialy, Jan: *See*—
Kosinska, Wanda; Grzelak, Dorota; Penczek, Irena; and Bialy, Jan, 4,687,799, Cl. 524-100.000.

Bidwell, Robert E. Torque limiting fastener. 4,687,392, Cl. 411-6.000.

Biller, Bruce A., to S&C Electric Company. Arrangement for connecting an electric device with a mounting therefor. 4,687,277, Cl. 439-621.000.

Binder, Karl-Franz; and Czermak, Ladislaus. Machine tool for cutting or the like. 4,687,901, Cl. 219-121.0LG.

Biniasz, Franz-Josef; Engl, Bernhard; Fuchs, Axel; and Huser, Margit, to Hoesch Stahl AG. Worked low-temperature tough ferritic steel. 4,687,525, Cl. 148-336.000.

Biolchini, Robert J.; Boward, Willard L., Jr.; and Wang, Kuei-Hsiung, to FMC Corporation. Sodium-limestone double alkali flue gas desulfurization process with improved limestone utilization. 4,687,648, Cl. 423-242.000.

BioSpecific Technologies, Inc.: *See*—
Jarrett, Robert D.; and McCain, G. Howard, 4,687,808, Cl. 525-54.100.

BIOTEK, Inc.: *See*—
Nuwayser, Elie S., 4,687,481, Cl. 604-897.000.

Birch, Norman R.; Pauza, William V.; and Sheesley, Wilmer L., to AMP Incorporated. Segmented construction for electrical connector assembly. 4,687,446, Cl. 439-553.000.

Bisbing, Robert H., to Southco, Inc. Over-center toggle latch. 4,687,237, Cl. 292-78.000.

Biwi S.A.: *See*—
Bourquard, Pierre; and Bourquard, Yves, 4,686,783, Cl. 40-304.000.

Blackaby, Barry G.: *See*—
Carll, Richard T.; and Blackaby, Barry G., 4,688,183, Cl. 364-554.000.

Blackburn, Robert S., to United States of America, Energy. Adapter plate assembly for adjustable mounting of objects. 4,687,165, Cl. 248-274.000.

Bladh, Ake, to Elektro-Bladh AB. Cable lead-in device. 4,686,738, Cl. 16-2.000.

Bland, Gerald F.; and Johnson, Stephen R. Marine propulsion device exhaust system. 4,687,450, Cl. 440-89.000.

Blander, Milton; and Cook, Glenn M., to United States of America, Energy. Refractory lining for electrochemical cell. 4,687,564, Cl. 204-243.00R.

Blaupunkt-Werke GmbH: *See*—
Fricke, Walter, 4,688,110, Cl. 360-19.100.

Bleke, Jim: *See*—
Wyatt, W. Gerald; White, Richard L.; and Bleke, Jim, 4,686,779, Cl. 34-168.000.

Blessum, Norman S., to Xebec Development Partners, Ltd. Detection and amplification circuit. 4,688,119, Cl. 360-77.000.

Blineau, Joseph; Pommier, Daniel; and Thomas, Claude, to Etablissement Public de Diffusion Dit "Telediffusion de France". Multiplex channels for continuous flow for numerical signal. 4,688,218, Cl. 370-106.000.

Bloch, Arthur R.; and Bloch, Kenneth A. Video recording system. 4,688,105, Cl. 358-335.000.

Bloch, Kenneth A.: *See*—
Bloch, Arthur R.; and Bloch, Kenneth A., 4,688,105, Cl. 358-335.000.

Block, Hermann; and Kelly, Jeffrey P. Electronheological fluids. 4,687,589, Cl. 252-73.000.

Block, Jay M.: *See*—
Heath, Herbert E.; and Block, Jay M., 4,688,072, Cl. 357-45.000.

Blum, Arnold, to International Business Machines Corp. Built-in parallel testing circuit for use in a processor. 4,688,222, Cl. 371-25.000.

Bobick, John H. Portable manually operated rescue and lowering cable. 4,687,077, Cl. 182-235.000.

Boc Group, Inc., The: *See*—
Maclean, Donald L.; Krishnamurthy, Ramachandran; and Lerner, Steven L., 4,687,498, Cl. 62-17.000.

Boe, Ove S.: *See*—
Rasmussen, Hilmar O.; Petersen, Jorgen H.; Boe, Ove S.; and Clausen, Peter J. M., 4,687,893, Cl. 219-10.410.

Boehringer Mannheim Corporation: *See*—
Driskell, Thomas D., 4,687,443, Cl. 433-173.000.

Boehringer Mannheim GmbH: *See*—
Bosies, Elmar; and Gall, Rudi, 4,687,767, Cl. 514-89.000.

Boeing Company, The: *See*—
Johnson, Edward N.; and Puncoch, Miloslav, 4,687,162, Cl. 244-213.000.

Bogelein, Georg: *See*—
von Bernus, Ludwig; Bogelein, Georg; and Waldhutter, Rudolf, 4,687,992, Cl. 324-232.000.

Boger, Bentley J.; and Petrecca, Peter J., to Nordson Corporation. Continuous/intermittent adhesive dispensing apparatus. 4,687,137, Cl. 239-124.000.

Boger, Manfred, to Ciba-Geigy Corporation. Certain 3-trifluoromethyl-5-chloro-2-pyridyloxy-aniline intermediates. 4,687,855, Cl. 546-300.000.

Boggs, Steven A.: *See*—
Stone, Gregory C.; Boggs, Steven A.; and Braun, Jean-Marie, 4,687,882, Cl. 174-102.0SC.

Bohg, Armin; Fischer, Ludwig; Gantz, Bruno; Hartmann, Kurt; and Wolfert, Gerhard, to International Business Machines Corporation. Electromagnetic actuator mechanism in particular for print hammer drives. 4,688,012, Cl. 335-276.000.

Bohm, Gunther: *See*—
Schuller, Edmund; Bohm, Gunther; and Karl, Rupert, 4,687,148, Cl. 242-18.0PW.

Bolduc, Henry P., Jr.: *See*—
Allain, Raymond J.; Bolduc, Henry P., Jr.; Patterson, Thomas R.; and Ingram, Timothy J., 4,686,902, Cl. 101-424.000.

Bolg, Ulrich: *See*—
Ams, Felix; Bolg, Ulrich; and Wurster, Helmut, 4,688,087, Cl. 358-100.000.

Bolingen, Johann: *See*—
Kronschnabel, Hartmut; Goerings, Wilhelm; Bolingen, Johann; and Kleine-Vennekate, Gerd, 4,687,600, Cl. 252-627.000.

Bomin Solar GmbH & Co. KG: *See*—
Kleinwachter, Jurgen, 4,686,960, Cl. 126-422.000.

Bond, Leroy E.: *See*—
Cambo, William H.; Whitely, Elliott F.; and Bond, Leroy E., 4,687,697, Cl. 428-201.000.

Bondioli, Edi. Device for maneuvering fast connection tangential button operated of splined profile clutches, especially on end forks of agriculture cardanic shafts. 4,687,367, Cl. 403-322.000.

Bone, James, to Vickers Shipbuilding and Engineering Limited. Article handling apparatus. 4,687,409, Cl. 414-750.000.

Bongiovanni, Lino. Removing sediment from wine. 4,687,115, Cl. 215-355.000.

Bonnet, Ludwig; and Hiltebrandt, Siegfried, to Richard Wolf GmbH. Instrument for endoscopic operations. 4,686,965, Cl. 128-4.000.

Bonnet, Ludwig, to Richard Wolf GmbH. Catheter for widening a puncture channel. 4,686,984, Cl. 128-343.000.

Borduz, Lucian; and Raj, Kuldip, to Ferrofluidics Corporation. Low viscosity, electrically conductive ferrofluid composition and method of making and using same. 4,687,596, Cl. 252-510.000.

Bork, Carl R., Jr.: *See*—
Danko, Oliver L.; and Bork, Carl R., Jr., 4,687,017, Cl. 137-315.000.

Bosch-Siemens Hausgeraete GmbH: *See*—
Eichler, Walter; Farber, Karlheinz; and Fischer, Elisabeth, 4,687,909, Cl. 219-502.000.

Bosies, Elmar; and Gall, Rudi, to Boehringer Mannheim GmbH. Certain 1-hydroxyethane, 1,1-di-phosphonic acid derivatives useful in treating calcium metabolism disturbances. 4,687,767, Cl. 514-89.000.

Bothun, Eugene L.; and Hine, Brent S., to Sit-N-Sip, Inc. Self-bleeding bung dispenser valve. 4,687,122, Cl. 222-183.000.

Boulais, Dennis R.: *See*—
Stokoe, Philip T.; and Boulais, Dennis R., 4,687,887, Cl. 200-16.00F.

Bourquard, Pierre; and Bourquard, Yves, to Biwi S.A. Tag for wild game. 4,686,783, Cl. 40-304.000.

Bourquard, Yves: *See*—
Bourquard, Pierre; and Bourquard, Yves, 4,686,783, Cl. 40-304.000.

Bouveret, Elisabeth: *See*—
Malbrancq, Jean-Michel; Bouveret, Elisabeth; and Angleraud, Rene , 4,687,580, Cl. 210-651.000.

Boward, Willard L., Jr.: *See*—
Biolchini, Robert J.; Boward, Willard L., Jr.; and Wang, Kuei-Hsiung, 4,687,648, Cl. 423-242.000.

Bowen, Howard; Henderson, David; and Olson, Carl, to Research Technology International. Optical motion picture film inspection system. 4,687,943, Cl. 250-570.000.

Bowker, Christopher D., to Tegal Corporation. Selective plasma etching during formation of integrated circuitry. 4,687,543, Cl. 156-643.000.

Bowles Fluidics Corporation: *See*—
Stouffer, Ronald D.; and Sulsky, Paul L., 4,686,890, Cl. 98-2.000.

Bowman, Lyle M.: *See*—
Lin, Shaow B.; Bowman, Lyle M.; Chandrasekaran, S. Kumar; and Harvey, Thomas B., III, 4,687,816, Cl. 525-279.000.

BP Chemicals Limited: *See*—
Dumain, Andre ; and Raufast, Charles, 4,687,381, Cl. 406-52.000.
Green, Michael J., 4,687,755, Cl. 502-159.000.

Braach, Otto: *See*—
Babendererde, Siegmund; Hillemeier, Bernd; and Braach, Otto, 4,687,374, Cl. 405-146.000.

Braemer, Mark C.: *See*—
Alford, Robert A.; and Braemer, Mark C., 4,687,534, Cl. 156-308.600.

Brahmavar, Subhash M.; and Litch, Ernest W., III, to General Electric Company. Electronically controlled motor and methods of operating same. 4,687,977, Cl. 318-492.000.

Brandes, Karlheinz K.: *See*—
Parrott, Stephen L.; Kukes, Simon G.; and Brandes, Karlheinz K., 4,687,757, Cl. 502-220.000.

Brantman, Eugene R., to Nutri-Fuels Systems, Inc. Nutritional composition for enhancing skeletal muscle adaptation to exercise training. 4,687,782, Cl. 514-561.000.

Brault, Roland, to Thomson-CSF, France. Device for generating a fractional frequency of a reference frequency. 4,688,237, Cl. 377-48.000.

Braun, Albert: *See*—
Schrodter, Hermann; Braun, Albert; and Kampmann, Friedrich-Wilhelm, 4,687,512, Cl. 75-58.000.

Braun, Clarence: *See*—
Zupanick, Joseph E.; and Braun, Clarence, 4,687,335, Cl. 356-416.000.

Braun, Hilarion; Lush, Linda M.; and Antolik, Ralph E., III, to Eastman Kodak Company. Method and apparatus for sensing satellite ink drop charge and adjusting ink pressure. 4,688,047, Cl. 346-1.100.

Braun, Jean-Marie: *See*—
Stone, Gregory C.; Boggs, Steven A.; and Braun, Jean-Marie, 4,687,882, Cl. 174-102.0SC.

Braun, Oskar, to Pfaff Industriemaschinen GmbH. Material thickness sensing device for sewing machines. 4,686,917, Cl. 112-311.000.

Brendgord, Thomas; and Otte, George E., to American Sterilizer Company. Apparatus for transporting wheeled carriers. 4,687,215, Cl. 280-79.10R.

Breslau, Steven M., to Sima Products Corporation. Video camera stabilizer. 4,687,309, Cl. 354-82.000.

Brewer, Aubrey W. Structure leveling system. 4,686,773, Cl. 33-367.000.

Brey, Larry A.: *See*—
Cadwell, Donald E.; and Brey, Larry A., 4,687,729, Cl. 430-271.000.

Brigati, David J.: *See*—
Ward, David C.; Leary, Jeffry J.; and Brigati, David J., 4,687,732, Cl. 435-6.000.

Brinckmann, Paul; and Anapliotis, Emmanuel, to MECRON medizinische Produkte GmbH. Implant, particularly endoprosthesis. 4,687,486, Cl. 623-16.000.

Brink, Ted: *See*—
Zeilstra, Jacobus J.; and Brink, Ted, 4,687,835, Cl. 528-300.000.

Brinkmeyer, Hermann; Hubler, Gerhard; Perrey, Hermann; Nippe, Burkhard; and Kober, Heinrich, to Agfa Gevaert Aktiengesellschaft. Magnetic recording carrier containing radiation hardenable dispersing agents. 4,687,709, Cl. 428-425.900.

BRIntec Corporation: *See*—
DeSanti, Raymond J., 4,687,289, Cl. 350-96.200.

Bristol-Myers Company: *See*—
Alderdice, Marc T., 4,687,772, Cl. 514-273.000.
Gamble, Donald E.; Hunter, Harry L.; and McKinney, Gordon R., 4,687,771, Cl. 514-253.000.

Britax-Kolb GmbH & Co.: *See*—
Ernst, Hans-Hellmut; and Lochbihler, Edmund, 4,687,253, Cl. 297-478.000.

British Petroleum Company, p.l.c., The: *See*—
Howes, Roger J.; and Othen, David G., 4,687,595, Cl. 252-387.000.

Brodrecht, Gerald L. C.; and Halwa, Rueben. Bale bagging apparatus. 4,686,817, Cl. 53-567.000.

Brolin, Charles A.; Jennerjohn, Dennis A.; and Moeller, Richard E., to FMC Corporation. Inert atmosphere control for induction heated pressure welding system. 4,687,892, Cl. 219-8.500.

Brooke, James W.: *See*—
Baker, Richard W.; and Brooke, James W., 4,687,660, Cl. 424-465.000.

Brosius, James R.; and Brosius, Ralph C., to Research Plus, Inc. Power actuated tool for driving fastener. 4,687,126, Cl. 227-10.000.

Brosius, Ralph C.: *See*—
Brosius, James R.; and Brosius, Ralph C., 4,687,126, Cl. 227-10.000.

Brother Kogyo Kabushiki Kaisha: *See*—
Igi, Hisashi; Ohta, Eiichi; Bandai, Yasuhito; and Takagi, Kazuhiko, 4,687,352, Cl. 400-73.000.
Yoshimura, Motokazu; Hirata, Koichi; and Kurebayashi, Kimie, 4,688,192, Cl. 364-900.000.

Brouty-Boye, Huguette: *See*—
Vairel, Edmond G.; Brouty-Boye, Huguette; Toulemonde, Francis; and Doutremepuich, Christian, 4,687,765, Cl. 514-56.000.

Brown, Craig R., to Dembecki, Stanley L. High performance distributorless digital ignition system for internal combustion engines. 4,686,953, Cl. 123-606.000.

Brown, Craig R., to Dembecki, Stanley L. High performance digital ignition system for internal combustion engines. 4,686,954, Cl. 123-607.000.

Brown, Eric W.: *See*—
Tai, Henry T.; and Brown, Eric W., 4,687,475, Cl. 604-248.000.

Brown, Ian A.; McMahon, Dennis R.; Rosas, Robin R.; Scopatz, Stephen D.; and Wind, Karen L., to Pennwalt Corporation. Apparatus for sizing and sorting articles. 4,687,107, Cl. 209-556.000.

Brown, Karl L.: *See*—
McIntyre, Raymond D.; and Brown, Karl L., 4,687,936, Cl. 250-397.000.

Brown, Richard F.: *See*—
Edelstein, Fred; and Brown, Richard F., 4,687,048, Cl. 165-1.000.

Brown, Thomas G.: *See*—
Scribner, James R.; Brown, Thomas G.; and Caracciolo, Anthony, Jr., 4,688,026, Cl. 340-572.000.

Brown & Williamson Tobacco Corporation: *See*—
Denier, Robert F.; and marshall, Robert H., 4,687,007, Cl. 131-296.000.

Browner, Richard F.; and Willoughby, Ross C., to Georgia Tech Research Corporation. Monodisperse aerosol generator. 4,687,929, Cl. 250-282.000.

Browning Arms Company: *See*—
Larson, Marlow W., 4,686,955, Cl. 124-23.00R.

Bruer, Dirk; Tooten, Karl-Heinz; and Freye, Theo, to Claas OHG. Rotational sphere press for agricultural grain stem products. 4,686,812, Cl. 53-118.000.

Bruggemann & Brand GmbH & Co. KG: *See*—
Logemann, Horst, 4,687,160, Cl. 244-142.000.

Brunnmueller, Fritz; and Kroener, Michael, to BASF Aktiengesellschaft. Preparation of 2-aminopyrazines and pyrazines. 4,687,848, Cl. 544-336.000.

Brunswick Corporation: *See*—
Fenrich, William G., 4,687,449, Cl. 440-61.000.
Kruncos, Francis E., 4,687,991, Cl. 324-169.000.

Bryant, Peter B. Mulcher attachment. 4,686,819, Cl. 56-295.000.

Bryant, Robert L.: *See*—
Parker, John A.; Feldman, Rubin; and Bryant, Robert L., 4,687,651, Cl. 423-315.000.
Parker, John A.; Feldman, Rubin; and Bryant, Robert L., 4,687,785, Cl. 521-106.000.

BTU Engineering Corporation: *See*—
Lucey, Willard J.; and Waugh, Arthur, 4,687,911, Cl. 219-553.000.

Bucher, George D.: *See*—
Cellier, Francis; Graulty, Robert T.; Johnson, Wendell L.; Batson, David M.; Limpert, John C.; Wu, Christopher K. C.; Bucher, George D.; John, Clarence D., Jr.; Steinkirchner, John E.; Larouere, Paula J.; Shah, Hemant H.; and Williams, Robert A., 4,687,605, Cl. 264-0.500.

Buck, Rainer; Wessel, Wolf; and Stumpp, Gerhard, to Robert Bosch GmbH. System for control of the supercharging of an internal combustion engine. 4,686,830, Cl. 60-603.000.

Buck, Robert H.; Cowan, Kent G.; Doughty, John P.; and Marshall, Stephen E., to BDC Electronics. Combined smoke and gas detection apparatus. 4,688,021, Cl. 340-521.000.

Budmiger, Hermann, to Impexor AG. Eye protection device for welder protection equipment. 4,686,711, Cl. 2-8.000.

Budzich, Tadeusz, to Fluid Power Components, Inc. Water-oil separating system including centrifugal type separator and flow controls therefor. 4,687,572, Cl. 210-114.000.

Buhk, Artur: *See*—
Schoettle, Klaus; Buhk, Artur; Kamm, Eugen; Berger, Heinz; and Gaiser, Dieter, 4,687,157, Cl. 242-199.000.

Burckhardt, Rainer. Dental device. 4,687,003, Cl. 128-777.000.

Burgmeier, Juergen; and Doemer, Josef, to Siemens Aktiengesellschaft. Code error overlaying in digital transmission signals. 4,688,226, Cl. 371-57.000.

Burke, Dennis W.: *See*—
Harris, William H.; and Burke, Dennis W., 4,686,971, Cl. 128-92.0VT.

Burkhalter, John F.; and Weigand, Willis A., to Halliburton Company. Liquid fluid loss control additive for oil field cements. 4,687,516, Cl. 106-90.000.

Burleson, Robert M., to Greenville Steel Car Company. Rail car bridge plate securement assembly with rotating leaf. 4,686,909, Cl. 105-378.000.

Burlington Industries, Inc.: *See*—
Connelly, Roland L.; Willis, Robert F.; Phelan, Jeremy D.; and Nealen, Kathleen A., 4,688,178, Cl. 364-470.000.

Burns, David R. Necktie holder. 4,686,716, Cl. 2-152.00R.

Burns, Francis C.; Dreyfus, Russell W.; and Susko, John R., to International Business Machines Corp. End point detection and control of laser induced dry chemical etching. 4,687,539, Cl. 156-626.000.

Burron Medical Inc.: *See*—
Raines, Kenneth, 4,687,473, Cl. 604-251.000.

Burroughs, Ralph B. Swing wing keel. 4,686,922, Cl. 114-124.000.

Burroughs Wellcome Co.: *See*—
Baker, Richard W.; and Brooke, James W., 4,687,660, Cl. 424-465.000.

Burton, Stan, to Fisco Products Limited. Tape measure. 4,687,155, Cl. 242-107.300.

Burwell, Gar W. N., to Rails Company. Railway fastening. 4,687,134, Cl. 238-349.000.

Bury, Joseph R. Hollowshoe footwear. 4,686,781, Cl. 36-132.000.

Butler, James R., to Precision Monolithics, Inc. JFET active load input stage. 4,687,984, Cl. 323-315.000.

Butler, Lorraine M. Coupler and protector device for two remote control units. 4,686,745, Cl. 24-17.00B.

Buysch, Hans-Josef: *See*—
Weber, Karl-Arnold; Buysch, Hans-Josef; Noble, Karl-Ludwig; and Traubel, Harro, 4,687,830, Cl. 528-64.000.

B.V. Optische Industrie "De Oude Delft": *See*—
van der Linden, Bernardus G., 4,687,920, Cl. 250-205.000.

Byers, Charles L.; Loeb, Gerald E.; Merzenich, Michael M.; and Rebscher, Stephen J., to University of California, Regents of the. Method for making an intracochlear electrode array. 4,686,765, Cl. 29-858.000.

Byers, Jim D.: *See*—
Banasiak, Dennis S.; Mozdzen, Edward C.; and Byers, Jim D., 4,687,867, Cl. 556-52.000.

C.T.F. Research Company: *See*—
Cygielski, Bozena, 4,687,467, Cl. 604-110.000.

Cadwell, Donald E.; and Brey, Larry A., to Minnesota Mining and Manufacturing Company. Lithographic plate. 4,687,729, Cl. 430-271.000.

Calculagraph Company: *See*—
Fryer, Warren R., 4,688,215, Cl. 370-102.000.

Calderon-Quintero, Miguel H.: *See*—
Valdes-Neri, Jaime; Gomez-Sanchez, Abel; and Calderon-Quintero, Miguel H., 4,687,503, Cl. 65-174.000.

Calmac Manufacturing Corporation: *See*—
McLinden, Mark O.; Didion, David A.; and MacCracken, Calvin D., 4,687,588, Cl. 252-67.000.

Calmar, Inc.: *See*—
Reeve, Randy F., 4,687,113, Cl. 215-230.000.

Cambo, William H.; Whitely, Elliott F.; and Bond, Leroy E., to Lydall, Inc. Composite having improved transverse structural integrity and flexibility for use in high temperature environments. 4,687,697, Cl. 428-201.000.

Camco Inc.: *See*—
St. Louis, Robert M., 4,687,262, Cl. 312-276.000.

Cameron, Donald C.; and Shireman, Paul M., to Dowell Schlumberger Incorporated. Frangible pressure relief disc assembly and positive displacement pumps containing the disc assembly. 4,687,421, Cl. 417-296.000.

Campbell, David K.: *See*—
Towner, David K.; and Campbell, David K., 4,688,201, Cl. 369-44.000.

Campbell, Edward R., III; and Lewis, Henry G., Jr., to RCA Corporation. Demodulation phase error compensation circuitry as for an automatic deghosting system. 4,688,096, Cl. 358-167.000.

Campen, George V.: *See*—
Snyder, Leon T.; Scarfone, Frank A.; Reuss, James L.; Campen, George V.; and Yates, George H., 4,686,999, Cl. 128-716.000.

Canadian National Railway Company: *See*—
Astley, George W., 4,687,258, Cl. 303-3.000.

Canadian Patents and Development Limited: *See*—
Ringer, Thomas R., 4,687,163, Cl. 246-428.000.

Canny, Jean-Paul L.: *See*—
Bernard, Alain M.; Canny, Jean-Paul L.; and Touboul, Pierre L., 4,688,141, Cl. 361-233.000.

Canon Kabushiki Kaisha: *See*—
Edakubo, Hiroo; and Nagasawa, Kenichi, 4,688,102, Cl. 358-310.000.
Haganuma, Tomoyuki; and Kaneko, Yoji, 4,688,100, Cl. 358-261.000.
Hamazaki, Bunei; and Ayata, Naoki, 4,688,088, Cl. 358-101.000.
Hirata, Osamu, 4,688,189, Cl. 364-900.000.
Ikemori, Keiji; Tanaka, Tsunefumi; and Kato, Masatake, 4,687,302, Cl. 350-427.000.
Inamoto, Tadayoshi; Noguchi, Hiromichi; and Munakata, Megumi, 4,688,052, Cl. 346-140.00R.
Inamoto, Tadayoshi; Noguchi, Hiromichi; and Munakata, Megumi, 4,688,054, Cl. 346-140.00R.
Ito, Michio; Shinohara, Yukimasa; and Imai, Nobuhiro, 4,687,283, Cl. 350-6.800.
Kamata, Shigeru; and Iizuka, Toshimi, 4,687,297, Cl. 350-252.000.
Noguchi, Hiromichi; Inamoto, Tadayoshi; and Munakata, Megumi, 4,688,053, Cl. 346-140.00R.
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Ogawa, Kyosuke, 4,687,722, Cl. 430-59.000.
Ohsawa, Toshifumi, 4,687,307, Cl. 354-21.000.
Sakai, Shinji; and Kawabata, Takashi, 4,687,915, Cl. 250-201.000.
Someya, Hiromi, 4,687,308, Cl. 354-82.000.
Takahashi, Sadatoshi; Kato, Masatake; and Tsuji, Sadahiko, 4,687,303, Cl. 350-427.000.
Tsunekawa, Tokuichi; Sato, Yuichi; Kawabata, Takashi; and Matsumura, Susumu, 4,687,914, Cl. 250-201.000.

Canusa Coating Systems Limited: *See*—
Hansen, Ralph H., 4,687,797, Cl. 524-94.000.

Capecchi, Mario R.: *See*—
Sharp, Phillip A.; Capecchi, Mario R.; RajBhandary, Uttam L.; and Laski, Frank A., 4,687,737, Cl. 435-68.000.

Capizzi, Anthony, Jr., to United Technologies Corporation. Dynamic angular position sensor for a reference gear tooth. 4,687,952, Cl. 307-261.000.

Caracciolo, Anthony, Jr.: *See*—
Scribner, James R.; Brown, Thomas G.; and Caracciolo, Anthony, Jr., 4,688,026, Cl. 340-572.000.

Cardiac Pacemakers, Inc.: *See*—
Salo, Rodney W.; and Pederson, Brian D., 4,686,987, Cl. 128-419.0PG.

Carey, Robert G. Soccer training ball assembly. 4,687,209, Cl. 273-411.000.

Carini, Richard P.; Donnelly, James A.; Ellis, Joseph J., Jr.; and Lanzoni, Thomas P., to International Business Machines Corporation. Merged data storage panel display. 4,688,033, Cl. 340-800.000.

Carl Freudenberg, Firma: *See*—
Freudenberg, Tillmann, 4,687,171, Cl. 248-550.000.

Carl, William P.: *See*—
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Carl-Zeiss-Stiftung: *See*—
Piller, Horst; and Schilling, Albert, 4,687,304, Cl. 350-526.000.

Carle & Montanari S.p.A.: *See*—
Ripani, Sergio; and Serafini, Giulio, 4,688,177, Cl. 364-468.000.

Carll, Richard T.; and Blackaby, Barry G., to United Technologies Corporation. Fire and security system with multi detector-occupancy-temperature-smoke (MDOTS) sensors. 4,688,183, Cl. 364-554.000.

Carns, Hutchinson W.: *See*—
Hjalmer, William D.; and Carns, Hutchinson W., 4,686,918, Cl. 112-410.000.

Carome, Edward F.: *See*—
Poorman, Thomas J.; Grissom, David; and Carome, Edward F., 4,688,200, Cl. 367-149.000.

Carre, Graham J. Personal decoration retainer. 4,686,837, Cl. 63-12.000.

Carroll, Charles B.; and Houston, David L., to RCA Corporation. Deflection yoke for adhesive assembly and mounting. 4,687,966, Cl. 313-440.000.

Carruthers, John W.: *See*—
Piche, Roland J.; and Carruthers, John W., 4,686,883, Cl. 84-313.000.

Caruso, Richard. Hair curler. 4,687,010, Cl. 132-33.00R.

Casad, Burton M.; Soni, Yogendra; and Jurinak, Jeff J., to Conoco Inc. Solvent enhanced fracture-assisted steamflood process. 4,687,058, Cl. 166-263.000.

Caserza, David D.; and Russell, John W., to FMC Corporation. Device for test firing of guns without ammunition. 4,686,886, Cl. 89-11.000.

Casio Computer Co, Ltd.: *See*—
Shibasaki, Sohei; Iwasaki, Yasumasa; and Ono, Noriki, 4,687,318, Cl. 355-5.000.

Casio Electronics Manufacturing Co., Ltd.: *See*—
Shibasaki, Sohei; Iwasaki, Yasumasa; and Ono, Noriki, 4,687,318, Cl. 355-5.000.

Cassani, Alexandre: *See*—
Muller, Jacques; and Cassani, Alexandre, 4,687,341, Cl. 368-109.000.

Casselberry, Robert F.; and Kania, Robert C., to Umec Corporation. High temperature particulate filter media test unit. 4,686,848, Cl. 73-38.000.

Castagna, John F., to Sparkomatic Corporation. Cassette adaptor for 8-track cartridge tape player. 4,688,121, Cl. 360-94.000.

Castaldo, Antonio. Cleaning composition for cymbals. 4,687,591, Cl. 252-90.000.

Castro, Bertrand: *See*—
Martinez, Jean; Bali, Jean-Pierre; Magous, Richard; Castro, Bertrand; and Demarne, Henri, 4,687,759, Cl. 514-18.000.
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Catalytica Associates: *See*—
Grate, John H.; and Hamm, David R., 4,687,872, Cl. 560-25.000.

Cavasa, Victor; and Fontaine, Jean-Marc, to Aerospatiale Societe Nationale Industrielle. System for supplying fuel to an aircraft engine. 4,686,825, Cl. 60-243.000.

Cavezzan, Jacques, to Rhone-Poulenc Specialites Chimiques. Platinum/triene complexes useful for hydrosilylation catalysis. 4,687,870, Cl. 556-136.000.

Celanese Corporation: *See*—
Clark, Terence J.; and Johnson, Robert E., 4,687,657, Cl. 423-412.000.

Cellier, Francis; Graulty, Robert T.; Johnson, Wendell L.; Batson, David M.; Limpert, John C.; Wu, Christopher K. C.; Bucher, George D.; John, Clarence D., Jr.; Steinkirchner, John E.; Larouere, Paula J.; Shah, Hemant H.; and Williams, Robert A., to Westinghouse Electric Corp. Manufacturing automation system for nuclear fuel rod production. 4,687,605, Cl. 264-0.500.

Celotex Corporation, The: *See*—
Andreichuk, Gregory, 4,687,790, Cl. 523-130.000.

Central Glass Company, Limited: *See*—
Koishi, Toshio; Tanaka, Isao; Yasumura, Takashi; and Nishikawa, Yukitoshi, 4,687,295, Cl. 350-96.340.

Centre National de la Recherche Scientifique: *See*—
Chaumont, Philippe; Beinert, Gerard; Herz, Jean; and Rempp, Paul, 4,687,814, Cl. 525-242.000.

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Cerni, Samuel: *See*—
Wilson, John F.; Cerni, Samuel; and Gjertsen, Robert K., 4,687,619, Cl. 376-260.000.
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Chaban, Richard J., to Warner Lambert Technologies, Inc. Microscope autofocus system. 4,687,913, Cl. 250-201.000.

Chaffee, Roger G.; and Stebleton, Leo F., to Dow Corning Corporation. Method of adjusting physical properties in silicone elastomeric sealant. 4,687,829, Cl. 528-17.000.

Chaffin, Roger J.; and Osbourn, Gordon C., to United States of America, Energy. Quantum well multijunction photovoltaic cell. 4,688,068, Cl. 357-30.000.

Chai, Sang-Hoon; and Lee, Jin-Hyo, to Electronics and Telecommunication Research Institute. Fabricating semiconductor device with polysilicon protection layer during processing. 4,686,762, Cl. 437-36.000.

Chalmers, Wallace G. Tandem axle air suspension. 4,687,222, Cl. 280-678.000.

Chamberlain, Stephen S., to Pratt & Whitney Canada Inc. Impeller shroud. 4,687,412, Cl. 415-134.000.

Chamuel, Jacques R., to Charles Stark Draper Laboratory, Inc., The. Noise reducing heat sink for semiconductor laser diodes. 4,688,076, Cl. 357-81.000.

Chan, Fred N. T.: *See*—
Kamel, Ahmed A.; Graul, Donald W.; Chan, Fred N. T.; and Gamble, Donald W., 4,688,091, Cl. 358-109.000.

Chan, Vincent S.; Chiu, Shiu-Chu; and Ohkawa, Tihiro, to GA Technologies Inc. Laser cooling of electron beam and free electron laser using laser cooling. 4,688,227, Cl. 372-2.000.

Chandrasekaran, S. Kumar: *See—*
Lin, Shaow B.; Bowman, Lyle M.; Chandrasekaran, S. Kumar; and Harvey, Thomas B., III, 4,687,816, Cl. 525-279.000.
Charles Stark Draper Laboratory, Inc., The: *See—*
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Chaumont, Philippe; Beinert, Gerard; Herz, Jean; and Rempp, Paul, to Centre National de la Recherche Scientifique. Partially hydrophilic, non-ionic crosslinked copolymers and their application to size exclusion chromatography in aqueous media. 4,687,814, Cl. 525-242.000.
Chembakaffery, George M.: *See—*
Zapletal, Henry; Wentzek, Horst F.; and Chembakaffery, George M., 4,686,753, Cl. 29-281.400.
Chemelewski, Gary, to Motorola, Inc. Dynamic noise blanker circuit. 4,688,265, Cl. 455-223.000.
Chemo-Sero-Therapeutic Res. Inst., The: *See—*
Ginnaga, Akihiro; Koba, Hiroshi; Sakuma, Shin; Kitagawa, Hisashi; Yamada, Akira; and Suzuki, Yoji, 4,687,738, Cl. 435-68.000.
Chemtronics: *See—*
Monsees, John C., 4,687,702, Cl. 428-308.400.
Chen, Han-Jing. Sliding plate control device of numerical lock for brief case. 4,686,842, Cl. 70-312.000.
Chen, Tsung H. Automatic actuation device for inflatable life-saving equipment. 4,687,451, Cl. 441-94.000.
Cheney, Richard F.; and Pierce, Richard H., to GTE Products Corporation. Method for making ultrafine metal powder. 4,687,510, Cl. 75-0.50B.
Cherry Corporation, The: *See—*
Leger, Raymond A., 4,687,889, Cl. 200-61.620.
Chester, Samuel J. Immunoassay for the detection of human colon cancer using a polyclonal antibody derived from a capillary culture of tumor cells. 4,687,734, Cl. 435-7.000.
Chevron Research Company: *See—*
Holland, John M., 4,688,268, Cl. 455-619.000.
Patzer, John F., II; and Moon, William G., 4,687,569, Cl. 208-407.000.
Chevron Research Corporation: *See—*
Smith, David S., 4,687,382, Cl. 406-168.000.
Chia, Chok J., to National Semiconductor Corporation. Molded pin grid array package GPT. 4,688,152, Cl. 361-408.000.
Chia, Weng-Kwen R.: *See—*
Smith, Richard D.; Oliver, Michael S.; Crouse, Richard D.; and Chia, Weng-Kwen R., 4,687,067, Cl. 175-340.000.
Chiacchio, Frank J.: *See—*
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Chicago Bridge & Iron Company: *See—*
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Chichibu Cement Co., Ltd.: *See—*
Suzuki, Osamu; Ishizaki, Kanjiro; and Ozawa, Seiichi, deceased, 4,687,614, Cl. 264-40.100.
Chinn, Leland J.: *See—*
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Chisso Corporation: *See—*
Motegi, Tsutomu; Aoki, Kazuo; and Kimura, Kazuhiro, 4,687,793, Cl. 523-200.000.
Chitre, Sanjeev R.; and Minaee, Behrooz, to Superwave Technology, Inc. Conveyorized microwave heating system. 4,687,895, Cl. 219-10.55A.
Chiu, Shiu-Chu: *See—*
Chan, Vincent S.; Chiu, Shiu-Chu; and Ohkawa, Tihiro, 4,688,227, Cl. 372-2.000.
Chivas Products Limited: *See—*
Moore, Ronald D.; Kavanaugh, James D.; Phelps, Richard A.; and Howard, Michael C., 4,686,741, Cl. 16-112.000.
Choay S.A.: *See—*
Vairel, Edmond G.; Brouty-Boye, Huguette; Toulemonde, Francis; and Doutremepuich, Christian, 4,687,765, Cl. 514-56.000.
Chow, Che C., to Xerox Corporation. Liquid development system. 4,686,936, Cl. 118-661.000.
Chow, Li Hang; Fawzi, Mahdi B.; and Ghebre-Sellassie, Isaac, to Warner-Lambert Company. Drug stabilization. 4,687,776, Cl. 514-312.000.
Chown, David P. M.; and Spencer, Malcolm. Optical fibre receiver. 4,688,267, Cl. 455-619.000.
Chreitzberg, Augustus M.; and Chiacchio, Frank J., to Exide Corporation. Method of making a sealed lead-acid battery with a gel electrolyte and sealed lead-acid storage battery made according to this method. 4,687,718, Cl. 429-190.000.
Christmas, Byron K.: *See—*
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Chrysler Motors Corporation: *See—*
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Zeigler, Thornton W., Jr.; Romanczuk, Chris S.; Betterton, Joseph T.; and Glover, Alfred H., 4,686,952, Cl. 123-572.000.
Chu, Daniel T., to Abbott Laboratories. Isoxazolo-pyrido-benzoxazine and isothiazolo-pyrido-benzoxazine derivatives. 4,687,770, Cl. 514-211.000.
Chumbley, James F. Insulative pleated window shade. 4,687,039, Cl. 160-84.00R.
Ciba-Geigy AG: *See—*
Tirel, Malcolm D.; and Long, William E., 4,687,846, Cl. 544-140.000.
Ciba-Geigy Corporation: *See—*
Boger, Manfred, 4,687,855, Cl. 546-300.000.
Martin, Pierre, 4,687,861, Cl. 548-565.000.
Nachbur, Hermann, 4,687,869, Cl. 556-132.000.
Ciccia, Lawrence P.: *See—*
Herdeg, Donald F.; and Ciccia, Lawrence P., 4,686,915, Cl. 112-121.120.
Circon Corporation: *See—*
Cohen, Jack; and Wardle, John L., 4,686,963, Cl. 128-4.000.
Citizen Watch Co., Ltd.: *See—*
Iinuma, Yoshio, 4,688,074, Cl. 357-79.000.
Ikehata, Tsutomu; Masuda, Katsuya; Yasunaga, Makoto; and Michioto, Takao, 4,687,355, Cl. 400-124.000.
Yamada, Osamu, 4,687,299, Cl. 350-336.000.
Citron, Irwin M.; and Kaszerman, Philip, to Singer Company, The. Wave packet communication subsystem for determining the sync pulses and correlating the data pulses of a wave packet. 4,688,251, Cl. 380-34.000.
Claas OHG: *See—*
Bruer, Dirk; Tooten, Karl-Heinz; and Freye, Theo, 4,686,812, Cl. 53-118.000.
Claber S.p.A.: *See—*
Roman, Gianfranco; Da Rold, Claudio; and Spadotto, Oliviano, 4,686,729, Cl. 15-29.000.
Clarion Co., Ltd.: *See—*
Takai, Kazuki; Ito, Yukio; Kinoshita, Shigeo; Kikuchi, Junichi; and Fukazawa, Toshihiko, 4,688,122, Cl. 360-96.500.
Tomizawa, Akimori, 4,688,248, Cl. 380-20.000.
Clark, Keith R., to Rheem Manufacturing Company. Foam insulated tank. 4,687,118, Cl. 220-444.000.
Clark, Terence J.; and Johnson, Robert E., to Celanese Corporation. Fabrication of SiC - AlN alloys. 4,687,657, Cl. 423-412.000.
Clarke, John; D'Eath, Roderick M.; and Haycock, Derek E., to Metal Box Public Limited Company. Heat treating thermoplastic sheet materials for thermo-forming. 4,687,612, Cl. 264-322.000.
Clausen, Eivind: *See—*
Allsop, Ivor J.; Allsop, Michael G.; Allsop, James D.; and Clausen, Eivind, 4,687,094, Cl. 206-44.00R.
Clausen, Peter J. M.: *See—*
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Clemence, Francois; and Le Martret, Odile, to Uclaf, Roussel. Alkyl β-oxo-benzenepropanoates. 4,687,857, Cl. 548-195.000.
Clemente, Ralph, to Coronet Industries, Inc. Blind construction. 4,687,038, Cl. 160-84.00R.
Clendinning, Robert A.; and Kwiatkowski, George T., to Amoco Corporation. Chain-extended poly(aryl ether ketones). 4,687,833, Cl. 528-125.000.
Cline, John A.; and Iuliano, William N., to General Electric Company. Torque limiter for prime mover. 4,687,410, Cl. 415-17.000.
Clinical Reference Laboratory, Inc.: *See—*
Stout, Robert L., 4,687,665, Cl. 424-86.000.
Coatex S.A.: *See—*
Gonnet, Olivier; and Rousset, Jacky, 4,687,789, Cl. 523-122.000.
Cobb, Melvin. Electrical power conservation circuit. 4,687,947, Cl. 307-17.000.
Coburn, Arthur E.; and Deal, Roger, to Heisco Metals Inc. Treatment of residues for metal recovery. 4,687,559, Cl. 204-110.000.
Coburn, Robert E.; and Matthews, John A., to United Technologies Corporation. Sliding joint for an annular combustor. 4,686,823, Cl. 60-39.320.
Cogema: *See—*
Simonnet, Jacques, 4,687,463, Cl. 494-83.000.
Cohen, Jack; and Wardle, John L., to Circon Corporation. Torsion resistant vertebrated probe of simple construction. 4,686,963, Cl. 128-4.000.
Colegrove, Russell K.; and Lawrence, Glen S., to Leybold-Heraeus GmbH. Electron-beam welding apparatus. 4,687,902, Cl. 219-121.0ET.
Coleman, Ann C.; and Garza, Irene E., to Texace Corporation. Visor and assembly method for visor. 4,686,713, Cl. 2-12.000.
Collins, Jerome H.; Mackey, Larry N.; and Spadini, Gianfranco L., to Procter & Gamble Company, The. Detergency builder system. 4,687,592, Cl. 252-99.000.
Colliva, Giovanni. Principles and appliances for cutting of spherical-faceted gems and gems thus obtained. 4,686,795, Cl. 51-125.000.
Comaty, Joseph E.: *See—*
Ehrenpreis, Seymour; Comaty, Joseph E.; and Balagot, Reuben C., 4,687,781, Cl. 514-557.000.
Combustion Engineering, Inc.: *See—*
Formanek, Frank J., 4,687,245, Cl. 294-87.100.
Commissariat a l'Energie Atomique: *See—*
DuPoy, Marc, 4,688,236, Cl. 377-48.000.
Commonwealth Scientific and Industrial Research Organization: *See—*
Laby, Ralph H.; and Lance, Mark A., 4,687,480, Cl. 604-891.000.
Compagnie Francaise des Petroles: *See—*
Jegousse, Michel; and Le Hir, Yves, 4,687,378, Cl. 405-171.000.
Comurhex: *See—*
Bachelard, Roland; and Joubert, Philippe, 4,687,601, Cl. 252-638.000.
Comyns, Alan E.; Morris, Gareth W.; and Sankey, John P., to Laporte Industries Limited. Process for the resolution of a racemate. 4,687,871, Cl. 556-138.000.
Con/Span Culvert Systems, Inc.: *See—*
Lockwood, William D., 4,687,371, Cl. 405-125.000.
Conax Buffalo Corporation: *See—*
Randazzo, Matthew J., 4,687,293, Cl. 350-96.230.

Condux International, Inc.: *See—*
Promersberger, Jon, 4,687,365, Cl. 403-2.000.
Conn, Sidney H. Audible low-fuel alarm for propane fuel tank. 4,688,028, Cl. 340-625.000.
Connelly, Roland L.; Willis, Robert F.; Phelan, Jeremy D.; and Nealen, Kathleen A., to Burlington Industries, Inc. Method and apparatus for inventory control to optimize usage of colored fabric. 4,688,178, Cl. 364-470.000.
Conners, John P., to AMCA International Corporation. Single bit storage and retrieval with transition intelligence. 4,688,191, Cl. 364-900.000.
Conoco Inc.: *See—*
Casad, Burton M.; Soni, Yogendra; and Jurinak, Jeff J., 4,687,058, Cl. 166-263.000.
Moore, John S.; and Ghassemi, Farhad, 4,687,057, Cl. 166-252.000.
Continental Gummi-Werke Aktiengesellschaft: *See—*
Pfeiffer, Hans-Dieter; Huinink, Heinrich; and Reese, Thorsten, 4,687,037, Cl. 152-209.00R.
Contraves AG: *See—*
Zemp, Georg, 4,687,051, Cl. 165-61.000.
Cook, Glenn M.: *See—*
Blander, Milton; and Cook, Glenn M., 4,687,564, Cl. 204-243.00R.
Cook, Henry F., to Westinghouse Electric Corp. Self-compensating voted logic power interface with tester. 4,687,623, Cl. 376-259.000.
Cook, Incorporated: *See—*
Gianturco, Cesare, 4,687,468, Cl. 604-153.000.
Cooke, Ronald D., to Beloit Corporation. Preventing sheet flutter in paper web dryers. 4,686,777, Cl. 34-116.000.
Cooper, Arthur J.: *See—*
Currie, Janie K.; Cooper, Arthur J.; and Pesa, Frederick A., 4,687,875, Cl. 585-469.000.
Cooper, Charles F.: *See—*
Shum, Wilfred P.; and Cooper, Charles F., 4,687,868, Cl. 556-57.000.
Cooper Industries, Inc.: *See—*
Angeles, Purita R., 4,687,294, Cl. 350-96.230.
Cooper Tire & Rubber Company: *See—*
Knurek, Thomas A.; Houston, Terry L.; and Hipsher, Gary L., 4,687,188, Cl. 267-140.100.
CooperBiomedical, Inc.: *See—*
Huebner, Victor R.; and Hartman, Scott K., 4,688,017, Cl. 340-347.0NT.
CooperVision, Inc.: *See—*
Dewey, David A.; and Pynckel, Paul C., 4,686,992, Cl. 128-303.100.
Tao, Frank, 4,687,997, Cl. 324-439.000.
Cope, Richard E.; and Stirling, Hugh G., to National Research Development Corporation. Soil-inversion cultivator. 4,687,065, Cl. 172-167.000.
Copeland, James L., to Ecolab Inc. Solid block chemical dispenser for cleaning systems. 4,687,121, Cl. 222-64.000.
Coran, Aubert Y., to Monsanto Company. Making rubber blends of diene rubber & EPR or EPDM. 4,687,810, Cl. 525-74.000.
Corbel, Henri: *See—*
Couderc, Pierre; and Corbel, Henri, 4,686,803, Cl. 52-97.000.
Corbett, Mary D. Jewelry display device. 4,687,103, Cl. 206-566.000.
Corby, Nelson R., Jr., to General Electric Company. Three-dimensional range camera. 4,687,325, Cl. 356-1.000.
Corby, Nelson R., Jr., to General Electric Company. Integrated range and luminance camera. 4,687,326, Cl. 356-5.000.
Cordova, David S.; Rowan, Hugh H.; and Lin, Leroy C., to Allied Corporation. Optimum formulation regions of reinforced thermoset composites. 4,687,796, Cl. 523-466.000.
Cordry, Christopher D.; and Weeks, Stephen T., to New Earth Games. Global domination board game. 4,687,206, Cl. 273-262.000.
Cornelius Company, The: *See—*
McMillin, John R., 4,687,120, Cl. 222-1.000.
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Barlier, Pernette R. M.; and Mazeau, Jean-Pierre, 4,687,751, Cl. 501-32.000.
Beall, George H., 4,687,749, Cl. 501-5.000.
Hayes, David V., 4,687,563, Cl. 204-224.00M.
Pinckney, Linda R., 4,687,750, Cl. 501-10.000.
Coronet Industries, Inc.: *See—*
Clemente, Ralph, 4,687,038, Cl. 160-84.00R.
Corrington, Donald G.; Hawkins, Stephen D.; and Sable, Daniel M., to RCA Corporation. Apparatus and method for effecting a key change via a cryptographically protected link. 4,688,250, Cl. 380-23.000.
Cortesi, Paolo; Donati, Gianni; and Saggese, Giuseppe, to Montedison S.p.A. Apparatus for preparing monodispersed, spherical, non-agglomerated metal oxide particles having a size below one micron. 4,687,643, Cl. 422-150.000.
Cosma, Frank. Tracheal cannula. 4,686,977, Cl. 128-207.170.
Cosmos, Pete; Scully, Michael J.; and Stephenson, Brian D., to AMP Incorporated. Shielding kit for electrical connectors terminating multiconductor 360 degree shielded cable. 4,687,263, Cl. 439-108.000.
Costanza, Daniel W.: *See—*
Appel, James J.; Costanza, Daniel W.; and Dastin, Richard M., 4,687,317, Cl. 355-3.00R.
Cotton, Robert V.; and Klodnicki, Edward J., to Teleconference Systems, Inc. High resolution graphics system for video/teleconferencing systems. 4,688,108, Cl. 358-257.000.
Cottrell, Roger L.; and Murphy, Alan S., to International Business Machines Corporation. Image transformations on an interactive raster scan or matrix display. 4,688,181, Cl. 364-521.000.
Couderc, Pierre; and Corbel, Henri, to Elf Isolation. Cladding element for outer facades, and application thereof. 4,686,803, Cl. 52-97.000.
Covington, John H., to Vari-Lite, Inc. Regulated power supply apparatus and method using reverse phase angle control. 4,688,161, Cl. 363-37.000.
Cowan, Kent G.: *See—*
Buck, Robert H.; Cowan, Kent G.; Doughty, John P.; and Marshall, Stephen E., 4,688,021, Cl. 340-521.000.
Cox, Percy T.: *See—*
Warren, Wayne F.; Nussbaum, Theodore W.; Cox, Percy T.; and Johnson, Donald L., 4,687,995, Cl. 324-341.000.
Cremonesi, Gianluigi, to Fimtessile Fabbrica Italiana Macchinario Tessile S.p.A. Negative dobby for weaving looms. 4,687,028, Cl. 139-71.000.
Crisci, Robert E., to Northern Engineering and Plastics Corp. Tamper indicating closure for containers. 4,687,114, Cl. 215-256.000.
Cromwell Paper Company, The: *See—*
Weil, David M.; Lieberman, Burton E.; and Adams, Ronald F., 4,687,698, Cl. 428-209.000.
Cronson, Harry M.; and Ross, Gerald F., to Sperry Corporation. Baseband detector with anti-jam capability. 4,688,041, Cl. 342-17.000.
Cronson, Harry M.; and Mara, Richard M., to Sperry Corporation. Short pulse receiver with anti-jam capability. 4,688,042, Cl. 342-19.000.
Crosbie, Gary M., to Ford Motor Company. Metalloid precursor powder and method of making same. 4,687,606, Cl. 264-8.000.
Cross, Andrew L.; and Moran, Thomas F., Jr., to Midwest Plastic Fabricators, Inc. Apparatus for forming plastic pipe couplings. 4,687,432, Cl. 425-387.100.
Crouse, Richard D.: *See—*
Smith, Richard D.; Oliver, Michael S.; Crouse, Richard D.; and Chia, Weng-Kwen R., 4,687,067, Cl. 175-340.000.
Crystal, Richard G.; and Gabor, Andrew, to Xerox Corporation. Impact printer with application of oblique print force. 4,686,900, Cl. 101-93.480.
Csapo, Erich: *See—*
Prunbauer, Kurt; and Csapo, Erich, 4,686,841, Cl. 70-276.000.
CSELT - Centro Studi e Labortatori Telecomunicazioni SpA: *See—*
Dal Degan, Neviano; and Rusina , Fulvio, 4,688,224, Cl. 371-31.000.
Cucksey, Edward L.: *See—*
LaManna, Richard J.; Hinton, James L.; and Cucksey, Edward L., 4,686,898, Cl. 101-18.000.
Cugley, Derwyn, to VSI Fasteners, Inc. Reusable container. 4,687,129, Cl. 229-44.00R.
Cullen, Paul R.; and Schroeder, Peter J., to Tilt-Lock, Inc. Lift and reorienting mechanism. 4,687,244, Cl. 294-86.410.
Cuming, Phyllis A.: *See—*
Wellman, Russel E.; and Cuming, Phyllis A., 4,687,360, Cl. 400-241.100.
Cunningham, Donald M.; Bartels, Mark A.; and Markum, T. Randall, to Emerson Electric Co. Electric immersion heating element assembly for use with a plastic water heater tank. 4,687,905, Cl. 219-336.000.
Cuno Incorporated: *See—*
Hou, Kenneth C.; and Liao, Tung-Ping D., 4,687,820, Cl. 525-54.100.
Curie, Kevin J.; and Jesse, Jerry F., to American Can Company. Oriented multiple layer films and bags made therefrom. 4,687,688, Cl. 428-35.000.
Currie, Janie K.; Cooper, Arthur J.; and Pesa, Frederick A., to Standard Oil Company, The. Metal coordination complexes of heteropolyacids as catalysts for alcohol conversion. 4,687,875, Cl. 585-469.000.
Cuvillier, Roger. Stereoscopic photography camera. 4,687,310, Cl. 354-115.000.
Cygielski, Bozena, to C.T.F. Research Company. One-time use medical syringe invention. 4,687,467, Cl. 604-110.000.
Czermak, Ladislaus: *See—*
Binder, Karl-Franz; and Czermak, Ladislaus, 4,687,901, Cl. 219-121.0LG.
Czernakowski, Waldemar: *See—*
Klanner, Wilfried; Schmaler, Dieter H.; Wetter, Hermann; Felsch, Bernhard; and Czernakowski, Waldemar, 4,687,255, Cl. 297-488.000.
Czirr, John B. Method for determining mine roof competency. 4,686,849, Cl. 73-38.000.
Daglish, Alan R.; Foster, Mark H.; and Marwick, William F., to Alcan International Limited. Metal forming lubricant. 4,687,587, Cl. 252-11.000.
Daiichi Koshuha Kogyo Kabushiki Kaisha: *See—*
Koga, Tadao; Sugimori, Mitsuru; Terasaki, Masanori; Maenosono, Tsukasa; Tsushima, Satoru; Yoshida, Kazuo; Kuriwaki, Tetsusho; and Hirado, Miharu, 4,687,894, Cl. 219-10.430.
Daiichi Seiyaku Co., Ltd.: *See—*
Kikuchi, Hiroshi; and Yamauchi, Hitoshi, 4,687,661, Cl. 424-38.000.
Daimler-Benz Aktiengesellschaft: *See—*
Baumert, Heinz; Schmitt-Maass, Nikolaus; and Karb, Erich, 4,687,254, Cl. 297-481.000.
Dainippon Ink and Chemicals, Inc.: *See—*
Ehara, Shunji; Nakamura, Shuji; and Akama, Masato, 4,687,832, Cl. 528-97.000.
Dainippon Screen Mfg. Co., Ltd.: *See—*
Fujii, Teruo, 4,687,323, Cl. 355-73.000.
Mitsuka, Ikuo; and Kuwabara, Akira, 4,687,944, Cl. 250-578.000.
Taniguchi, Hiroshi; Tanizawa, Mitsumasa; and Ueno, Masatoshi, 4,687,313, Cl. 354-320.000.
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correcting burst errors on low bit-rate coded speech signals transmitted on radio-communication channels. 4,688,224, Cl. 371-31.000.

Dallmann, Hermann: *See*—
Hensel, Hartmut; and Dallmann, Hermann, 4,687,699, Cl. 428-213.000.
Hensel, Hartmut; and Dallmann, Hermann, 4,687,700, Cl. 428-213.000.

D'Ambrosio, Steven M.: *See*—
Trewyn, Ronald W.; and D'Ambrosio, Steven M., 4,687,733, Cl. 435-7.000.

Danfoss A/S: *See*—
Rasmussen, Hilmar O.; Petersen, Jorgen H.; Boe, Ove S.; and Clausen, Peter J. M., 4,687,893, Cl. 219-10.410.

Danielson, Oscar. Trailer hitch coupling device. 4,687,220, Cl. 280-477.000.

Danko, Oliver L.; and Bork, Carl R., Jr., to Nupro Company. Inverted bellows valve. 4,687,017, Cl. 137-315.000.

Darling, Phillip H. Method of manipulating playing pieces. 4,687,207, Cl. 273-271.000.

Da Rold, Claudio: *See*—
Roman, Gianfranco; Da Rold, Claudio; and Spadotto, Oliviano, 4,686,729, Cl. 15-29.000.

Dastin, Richard M.: *See*—
Appel, James J.; Costanza, Daniel W.; and Dastin, Richard M., 4,687,317, Cl. 355-3.00R.

Davidov, Mircho A., to Oak Industries Inc. Pay TV scrambling by audio encryption. 4,688,247, Cl. 380-19.000.

Davidson, Alexander P.: *See*—
Furneaux, Robin C.; Rigby, William R.; and Davidson, Alexander P., 4,687,551, Cl. 204-11.000.

Davis, Cecil J.; Matthews, Robert; and Hildenbrand, Randall C., to Texas Instruments Incorporated. Vacuum processing system. 4,687,542, Cl. 156-643.000.

Davis, Glenn T. Radio controlled electric slack puller, brake and battery recharging system. 4,687,109, Cl. 212-76.000.

Davis, Harold L.; and Lee, Robert D., to Thomson Components-Mostek Corp. CMOS powerless rom code mask option select. 4,687,989, Cl. 324-758.00R.

Davis, Lincoln R.: *See*—
Falk, Charles D.; and Davis, Lincoln R., 4,687,373, Cl. 405-128.000.

Deal, Roger: *See*—
Coburn, Arthur E.; and Deal, Roger, 4,687,559, Cl. 204-110.000.

D'Eath, Roderick M.: *See*—
Clarke, John; D'Eath, Roderick M.; and Haycock, Derek E., 4,687,612, Cl. 264-322.000.

Deep Ocean Engineering Incorporated: *See*—
Hawkes, Graham S.; and Jeffrey, David C., 4,686,927, Cl. 114-312.000.

De Felice, Charles P.; and Le Roux, Donald F., to Du Pont de Nemours, E. I., and Company. Daylight X-ray cassette having variable size leaf springs. 4,688,243, Cl. 378-187.000.

DeGeorge, Peter J.; Ross, Roger F.; and Sims, Donald E., to International Business Machines Corporation. Automatic format, mode control and code conversion for data processing and printing apparatus. 4,687,353, Cl. 400-76.000.

de Graaf, Cornelis C., to Ericsson Paging Systems B.V. Paging receiver and transmitting device adapted to said receiver. 4,688,034, Cl. 340-825.480.

Degrande, Gilbert: *See*—
Nicolas, Jacques; and Degrande, Gilbert, 4,686,844, Cl. 72-13.000.

Degussa Aktiengesellschaft: *See*—
Renner, Hermann; Kleiss, Karlheinz; and Schlodder, Rainer, 4,687,514, Cl. 75-109.000.

DeHart, Dwain L., to Aluminum Company of America. Low drag conductor. 4,687,884, Cl. 174-130.000.

DeMaria, Anthony J.: *See*—
Newman, Leon A.; and DeMaria, Anthony J., 4,688,228, Cl. 372-18.000.

Demarne, Henri: *See*—
Martinez, Jean; Bali, Jean-Pierre; Magous, Richard; Castro, Bertrand; and Demarne, Henri, 4,687,759, Cl. 514-18.000.
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Brown, Craig R., 4,686,954, Cl. 123-607.000.

De Mendez, Michel: *See*—
Dubertret, Alain; Rizzo, Gilles; Bargain, Raymond; De Mendez, Michel; and Thenaisie, Jacky, 4,687,269, Cl. 439-161.000.

Demerson, Christopher A.: *See*—
Mobilio, Dominick; Demerson, Christopher A.; and Humber, Leslie G., 4,687,860, Cl. 548-439.000.

Demetriades, Peter G. Process for manufacturing a natural fiber mop. 4,687,256, Cl. 300-21.000.

Denekamp, Mark L.: *See*—
Hannon, Marwan; and Denekamp, Mark L., 4,688,244, Cl. 379-58.000.

Denier, Robert F.; and marshall, Robert H., to Brown & Williamson Tobacco Corporation. Process for drying and expanding tobacco. 4,687,007, Cl. 131-296.000.

Dering, Timothy A., to Chrysler Motors Corporation. Computer graphics copy system for technical illustration. 4,687,316, Cl. 355-3.00R.

De Robertis, Patrick: *See*—
Bartolo, William; De Robertis, Patrick; and Vanzetto, Daniel, 4,687,891, Cl. 200-153.00G.

Derrington, Carl E.: *See*—
Adams, Victor J.; and Derrington, Carl E., 4,686,764, Cl. 29-592.000.

DeSanti, Raymond J., to BRIntec Corporation. Fiberoptic splice organizer. 4,687,289, Cl. 350-96.200.

Desperben, Lydie; Sari, Hikmet; and Moridi, Said, to U.S. Philips Corporation. Circuit for recovering the carrier wave in digital transmission systems. 4,687,999, Cl. 329-109.000.

Deutsche Automobilgesellschaft mbH: *See*—
Von Benda, Klaus; and Schneider, Claus, 4,687,719, Cl. 429-234.000.

Deutsche Thomson-Brandt GmbH: *See*—
Rilly, Gerard, 4,688,164, Cl. 363-98.000.

Deweese, Richard A., to University of Tennessee Research Corporation. Device for handling and storage of extension cords and the like. 4,687,154, Cl. 242-96.000.

Dewey, David A.; and Pynckel, Paul C., to CooperVision, Inc. Ophthalmic beam director. 4,686,992, Cl. 128-303.100.

DeWitt, Gregory S.; Driscoll, John J.; and Shepherd, John L., to American Telephone and Telegraph Company, AT&T Laboratories. Switching system control arrangements. 4,688,214, Cl. 370-94.000.

Dickey, Leland C. Electrostatic particle dispersion for fluid mixture separation and chemical conversior. 4,687,493, Cl. 55-2.000.

Dickie, Ray A.; and Oaderi, Saiyed B. A., to Du Pont de Nemours, E. I., and Company. Crosslinkable composition comprising modified aminoepoxy resins - II. 4,687,812, Cl. 525-111.000.

Dictaphone Corporation: *See*—
Dwyer, John J.; Saltzman, Jeremy; and Hipp, Betsy, 4,688,117, Cl. 360-72.300.

Didion, David A.: *See*—
McLinden, Mark O.; Didion, David A.; and MacCracken, Calvin D., 4,687,588, Cl. 252-67.000.

Dieken, Alan P.: *See*—
Dufresne, Joel R.; and Dieken, Alan P., 4,686,991, Cl. 128-421.000.

DiFrank, Frank J.; and Tipping, Mark R., to Owens-Illinois, Inc. Apparatus for applying a solvent to plastic labels. 4,686,931, Cl. 118-50.000.

Dijkmans, Eise C.; Raets, Joseph G. G.; and Philips, Norbert J. L., to U.S. Philips Corporation. High Efficiency, low distortion amplifier. 4,688,001, Cl. 330-273.000.

DiNello, Robert K.; Gibbons, Ian; and Ullman, Edwin F., to Syntex (U.S.A.) Inc. Enzymatic poly-reactant channeling binding assay. 4,687,735, Cl. 435-7.000.

Dinur, Eldad: *See*—
Gorney, Moshe; and Dinur, Eldad, 4,687,143, Cl. 239-542.000.

Dixon, James R., Jr.: *See*—
Sprunt, Eve S.; Humphreys, Neil V.; Muegge, Ernest L.; and Dixon, James R., Jr., 4,688,238, Cl. 378-4.000.

Dixon, Walter O. Method and apparatus for operating and regenerating ion exchangers. 4,687,582, Cl. 210-677.000.

Djuric, Stevan W.; Chinn, Leland J.; and Rorig, Kurt J., to G. D. Searle & Co. 5-fluoro-3-oxa-prostacyclin compounds. 4,687,864, Cl. 549-414.000.

Dr.-Ing. Rudolf Hell GmbH: *See*—
Doelves, Juergen; and Schroedter, Wolfgang, 4,688,101, Cl. 358-299.000.

Doelves, Juergen; and Schroedter, Wolfgang, to Dr.-Ing. Rudolf Hell GmbH. Method for engraving printing cylinders having seamless joints within repeated patterns. 4,688,101, Cl. 358-299.000.

Doemer, Josef: *See*—
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Doering, Garry L. Pitless adaptor. 4,687,056, Cl. 166-88.000.

Doguchi, Nobushige: *See*—
Nagai, Yoshitaka; and Doguchi, Nobushige, 4,686,754, Cl. 29-418.000.

Dolan, Michael J.; Rapko, John N.; and Morgenthaler, William W., to Monsanto Company. Alkylaryl sulfonate compositions. 4,687,593, Cl. 252-182.000.

Domino Printing Sciences PLC: *See*—
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Donati, Gianni: *See*—
Cortesi, Paolo; Donati, Gianni; and Saggese, Giuseppe, 4,687,643, Cl. 422-150.000.

Donnelly, James A.: *See*—
Carini, Richard P.; Donnelly, James A.; Ellis, Joseph J., Jr.; and Lanzoni, Thomas P., 4,688,033, Cl. 340-800.000.

Donovan, John S. Non biased push-pull amplifiers. 4,688,000, Cl. 330-269.000.

Doornink, John R.: *See*—
Irwin, Jere F.; Doornink, John R.; and Roberts, Clive J., 4,687,144, Cl. 241-49.000.

Dorschner, Terry A.: *See*—
Holz, Michael; and Dorschner, Terry A., 4,687,331, Cl. 356-350.000.

Doryokuro Kakunenryo Kaihatsu Jigyodan: *See*—
Kambe, Mitsuru; and Sasaki, Shuichi, 4,687,624, Cl. 376-264.000.

Dougan, Donald R.; Peters, Gerald W.; and Kish, William C., to Babcock & Wilcox Company, The. Roll-and-race pulverizer with rotating throat. 4,687,145, Cl. 241-57.000.

Doughty, John P.: *See*—
Buck, Robert H.; Cowan, Kent G.; Doughty, John P.; and Marshall, Stephen E., 4,688,021, Cl. 340-521.000.

Doughty, Robert L.: *See*—
Douglas, Robert J.; Doughty, Robert L.; Mungovan, John P.; Andersen, Robert P.; and Abbott, Vaughan, 4,687,502, Cl. 65-164.000.

Douglas, Robert J.; Doughty, Robert L.; Mungovan, John P.; Andersen, Robert P.; and Abbott, Vaughan, to Emhart Industries, Inc. Universal servo-driven gob distributor. 4,687,502, Cl. 65-164.000.
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Vairel, Edmond G.; Brouty-Boye, Huguette; Toulemonde, Francis; and Doutremepuich, Christian, 4,687,765, Cl. 514-56.000.
Dovala, Donald L.: *See—*
Goudy, Paul R., Jr.; Weekley, William G.; Dovala, Donald L.; and Olszewski, Thomas C., Sr., 4,687,031, Cl. 141-9.000.
Dove, John; and Showell, Anthony D., to A. W. Showell (Surgicraft) Limited. Devices for spinal fixation. 4,686,970, Cl. 128-92.0YM.
Dover Corporation: *See—*
McMath, Jack A., 4,687,024, Cl. 137-615.000.
Dow Chemical Company, The: *See—*
Ezzell, Bobby R.; Carl, William P.; and Mod, William A., 4,687,821, Cl. 526-247.000.
Hillshafer, Douglas K.; and Turner, Robert B., 4,687,788, Cl. 521-163.000.
Kirchhoff, Robert A.; and Hahn, Stephen F., 4,687,823, Cl. 526-284.000.
Laughner, Michael K., 4,687,851, Cl. 544-398.000.
Van Herrtum, John C.; and Holmsen, Theodore W., 4,687,509, Cl. 71-121.000.
Vaughn, Walter L., 4,687,824, Cl. 526-292.200.
Wheeless, Michael R., 4,687,327, Cl. 356-70.000.
White, Mary L. N., 4,687,805, Cl. 524-569.000.
Dow Corning Corporation: *See—*
Chaffee, Roger G.; and Stebleton, Leo F., 4,687,829, Cl. 528-17.000.
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Cameron, Donald C.; and Shireman, Paul M., 4,687,421, Cl. 417-296.000.
Doyle, James H. Fluid mass flow controller. 4,687,020, Cl. 137-486.000.
Doyle, James J.; and Lecheheb, Ammar, to Domino Printing Sciences PLC. Continuous ink jet printing. 4,688,049, Cl. 346-1.100.
Doyle, Michael J.: *See—*
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Dresser Industries, Inc.: *See—*
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Snyder, Warren E., 4,686,951, Cl. 123-527.000.
Drew Chemical Corporation: *See—*
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Dreyfus, Russell W.: *See—*
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Driscoll, John J.: *See—*
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Driskell, Thomas D., to Boehringer Mannheim Corporation. Submergible post-type dental implant system and method of using same. 4,687,443, Cl. 433-173.000.
Druckenbrodt, Wolf-Gunther: *See—*
Lasberg, Ingo; and Druckenbrodt, Wolf-Gunther, 4,687,941, Cl. 250-506.100.
DTS, Inc.: *See—*
Phillips, Thomas, 4,686,911, Cl. 109-1.00S.
Dubbs, Jack F.; and Hanyen, Clyde K., to AMP Incorporated. Method of forming a flexible strip of encapsulated contact members. 4,686,766, Cl. 29-883.000.
Dubertret, Alain; Rizzo, Gilles; Bargain, Raymond; De Mendez, Michel; and Thenaisie, Jacky, to Souriau & Cie. Electric contact terminal thermo-insertable onto a printed circuit card and a connector having such terminals. 4,687,269, Cl. 439-161.000.
Dubrinsky, Max M.; and Edwards, Mary S. Treadmill assembly. 4,687,196, Cl. 272-69.000.
Dufresne, Joel R.; and Dieken, Alan P., to Minnesota Mining and Manufacturing Company. Electrical stimulator for biological tissue utilizing linear current output circuit. 4,686,991, Cl. 128-421.000.
Dugan, Michael J.: *See—*
Banzi, Frederick J., Jr.; Dugan, Michael J.; Johnson, Randolph W.; Saylor, Douglas D.; and Sharper, Craig A., 4,688,209, Cl. 370-15.000.
Dumain, Andre ; and Raufast, Charles, to BP Chemicals Limited. Device for introducing a powder with catalytic activity into a fluidized-bed polymerization reactor. 4,687,381, Cl. 406-52.000.
Dunaway, J. C.; and Jacobs, Paul L., to United States of America, Army. Gaseous secondary injection thrust vector control device. 4,686,824, Cl. 60-231.000.
Dunfee, David C. Waterbed sheet and insert means therefor. 4,686,726, Cl. 5-485.000.
Dunkle, Steven R.; and Haylock, John C., to Allied Corporation. Polyester molding compositions. 4,687,795, Cl. 523-436.000.
Dunlop Limited: *See—*
Atkin, Howard S., 4,687,261, Cl. 305-57.000.
Dunlop Olympic Limited: *See—*
Mathias, Anthony D., 4,686,916, Cl. 112-121.120.
Du Pont de Nemours, E. I., and Company: *See—*
Batzar, Kenneth, 4,687,708, Cl. 428-339.000.
De Felice, Charles P.; and Le Roux, Donald F., 4,688,243, Cl. 378-187.000.
Dickie, Ray A.; and Oaderi, Saiyed B. A., 4,687,812, Cl. 525-111.000.
Hasircoglu, Alexander W., 4,687,888, Cl. 200-51.100.
Hay, James V.; and Sauers, Richard F., 4,687,508, Cl. 71-92.000.
Levitt, George, 4,687,507, Cl. 71-92.000.
O'Grady, William R., 4,687,506, Cl. 71-92.000.
Siuta, Vincent P., 4,687,597, Cl. 252-512.000.
Sroog, Cyrus E., 4,687,611, Cl. 264-236.000.
DuPoy, Marc, to Commissariat a l'Energie Atomique. Process for the use of a binary register with n bistable cells making it possible to determine the ratio of two frequencies and apparatus for performing the process. 4,688,236, Cl. 377-48.000.
Durham, Clyde S.: *See—*
Mair, Steven M.; and Durham, Clyde S., 4,686,862, Cl. 74-44.000.
Durr, Manfred: *See—*
Wendel, Armin; Leyck, Sigurd; Wetzig, Helmut; Hager, Jorg; Durr, Manfred; and Ghyczy, Miklos, 4,687,766, Cl. 514-78.000.
Dustmann, Cord-Henrich, to BBC Aktiengesellschaft Brown, Boveri & Cie. Superconducting magnet system for operation at 13k. 4,688,132, Cl. 361-19.000.
Dutt, Herbert V.; and Santostasi, Paul A., to Sun Coast Plastics, Inc. Easy open container end closure. 4,687,116, Cl. 220-270.000.
Dwyer, Frank J.: *See—*
Zwolinski, Leon M.; and Dwyer, Frank J., 4,687,787, Cl. 521-131.000.
Dwyer, John J.; Saltzman, Jeremy; and Hipp, Betsy, to Dictaphone Corporation. Display including variable mode for a record and/or playback device. 4,688,117, Cl. 360-72.300.
Dye, G. Frank: *See—*
Furrow, Roger W.; Young, Harold R.; and Dye, G. Frank, 4,687,033, Cl. 141-59.000.
Dynamic Hydraulic Systems, Inc.: *See—*
Rosman, Allan H., 4,686,828, Cl. 60-415.000.
E. B. Eddy Forest Products, Ltd.: *See—*
Gladish, Herbert E., 4,687,079, Cl. 188-268.000.
E and E Specialties, Inc.: *See—*
White, Roger L., 4,687,128, Cl. 229-41.00R.
E. I. Du Pont de Neumours and Company: *See—*
Vassilatos, George, 4,687,610, Cl. 264-211.140.
E. J. Brooks Company: *See—*
Swift, Allan W., 4,687,240, Cl. 292-320.000.
E.M.M. Emiliana Macchine Maglieria S.R.L.: *See—*
Stoppazzini, Benito, 4,686,838, Cl. 66-71.000.
E. R. Squibb & Sons, Inc.: *See—*
Thottathil, John K., 4,687,865, Cl. 549-463.000.
Eagen, Duane M.; and Meek, Robert K., to Prince Valve, Inc. Jacketed valve. 4,687,018, Cl. 137-340.000.
Eagle Electric Mfg. Co., Inc.: *See—*
Leopold, Howard S., 4,688,135, Cl. 361-118.000.
Eames, Thomas R.: *See—*
MacGinitie, Gordon; and Eames, Thomas R., 4,688,212, Cl. 370-85.000.
Early, Stephen R.; and Grogan, Daniel, to Tektronix, Inc. Rhodium capped gold IC metallization. 4,687,552, Cl. 204-15.000.
Eastman Kodak Company: *See—*
Braun, Hilarion; Lush, Linda M.; and Antolik, Ralph E., III, 4,688,047, Cl. 346-1.100.
Funston, David L., 4,688,099, Cl. 358-214.000.
Malloy Desormeaux, Stephen G., 4,687,311, Cl. 354-217.000.
Wolcott, Dana W., 4,688,104, Cl. 358-332.000.
Wu, Stephen H.; and Sandhu, Mohammad A., 4,687,676, Cl. 427-3.000.
Eaton Corporation: *See—*
Phillips, Edward H.; and Johannsmeier, Karl-Heinz, 4,687,980, Cl. 318-640.000.
Ebara Corporation: *See—*
Maeda, Kensaku; and Mochizuki, Teiichi, 4,687,411, Cl. 415-122.00R.
Ebeling, Donald C., to Lowery, Loyd; and Lowery, Joyce. Low power generator. 4,687,945, Cl. 290-37.00R.
Ebihara, Ben T.; and Forman, Ralph, to United States of America, Administrator National Aeronautics & Space Administration. Apparatus for mounting a field emission cathode. 4,687,964, Cl. 313-237.000.
Ebihara, Yoshiyuki, to Etona Company, Limited. Staple cassette. 4,687,098, Cl. 206-340.000.
Ebisawa, Makoto; Shindo, Shuko; Hashizume, Kenichi; and Isa, Isao, to Japan Carlit Co., Ltd., The. Charge transfer complex. 4,688,153, Cl. 361-433.000.
Ecklund, Lawrence M., to Motorola, Inc. Controlled blend for AM stereo receivers. 4,688,254, Cl. 381-15.000.
Ecolab Inc.: *See—*
Copeland, James L., 4,687,121, Cl. 222-64.000.
Edakubo, Hiroo; and Nagasawa, Kenichi, to Canon Kabushiki Kaisha. Color video signal mixing system. 4,688,102, Cl. 358-310.000.
Edelstein, Fred; and Brown, Richard F., to United States of America, National Aeronautics and Space Administration. Monogroove cold plate. 4,687,048, Cl. 165-1.000.
Edholm, Thomas; and Stahl, Ulf, to Kamas Industri AB. Arrangement in grading and cleaning machines with screens. 4,687,105, Cl. 209-546.000.
Edridge, Michael J., to Ford Aerospace & Communications Corporation. Reconfigurable multiplexer. 4,688,259, Cl. 455-12.000.
Edwards, Mary S.: *See—*
Dubrinsky, Max M.; and Edwards, Mary S., 4,687,196, Cl. 272-69.000.
Edwards, William D., to R-Con International, Inc. Pipe connector structure. 4,687,233, Cl. 285-55.000.
Egner, Robert J.: *See—*
Seiz, Frederick G.; Seiz, Carl G.; and Egner, Robert J., 4,687,404, Cl. 414-276.000.

Eguchi, Yoshio; and Yamada, Atsushi, to Nippon Paint Company, Ltd. Acrylic resin composition for use in high solids paints. 4,687,822, Cl. 526-265.000.

Ehara, Shaw; Kojima, Yoshimi; Imada, Eiji; Hayakawa, Takashi; and Matsuyama, Toshiro, to Sharp Kabushiki. Photoreceptor for electrophotography comprising boron doped a-$Si_{1-x}N_x$:H:F. 4,687,724, Cl. 430-84.000.

Ehara, Shunji; Nakamura, Shuji; and Akama, Masato, to Dainippon Ink and Chemicals, Inc. Novel epoxy resin compositions. 4,687,832, Cl. 528-97.000.

Ehrenpreis, Seymour; Comaty, Joseph E.; and Balagot, Reuben C., to Endorfin, Inc. Analgesic and anti-inflammatory compositions. 4,687,781, Cl. 514-557.000.

Eibl, Johann: *See—*
Philapitsch, Anton; Wober, Gunter; Eibl, Johann; and Schwarz, Otto, 4,687,664, Cl. 424-85.000.

Eichelberger, Edward B.; Langmaid, Roger N.; Lindbloom, Eric; Motika, Franco; Sinchak, John L.; and Waicukauski, John A., to International Business Machines Corporation. Weighted random pattern testing apparatus and method. 4,687,988, Cl. 324-73.0AT.

Eichler, Walter; Farber, Karlheinz; and Fischer, Elisabeth, to Bosch-Siemens Hausgeraete GmbH. Apparatus for heating an air stream. 4,687,909, Cl. 219-502.000.

Eilers, Carl G.; Lee, Ronald B.; and Turner, Rudolf, to Zenith Electronics Corporation. CATV scrambling system with compressed digital audio in synchronizing signal intervals. 4,688,246, Cl. 380-9.000.

Eino, Muneyoshi, to Hitachi Metals, Ltd. Composite permanent magnet for magnetic excitation and method of producing the same. 4,687,608, Cl. 264-62.000.

Eisenhardt, Anne R.; and Hansen, Ole M., to Radiometer A/S. Composition and sampling receptacle method for treating blood with anticoagulant. 4,687,000, Cl. 128-760.000.

Eitrheim, John K.; and Someshwar, Ashok H., to Motorola, Inc. Method and apparatus for access to a PLA. 4,687,959, Cl. 307-465.000.

Eizenhofer, Alfons; and Grauel, Christoph, to U.S. Philips Corporation. Method of and arrangement for synchronizing the receiver arrangements in a digital multiplex transmission system. 4,688,210, Cl. 370-18.000.

Eklof, Åke T.; and Wiredal, Harry A. I., to Santrade Limited. Thread structure for percussion rock drilling. 4,687,368, Cl. 403-343.000.

Elabd, Hammam, to RCA Corporation. Opposite direction multiple-phase clocking in adjacent CCD shift registers. 4,688,066, Cl. 357-24.000.

Elbert, Lawrence E., to Baxter Travenol Laboratories, Inc. Ultrasonic horn driving apparatus and method with active frequency tracking. 4,687,962, Cl. 310-316.000.

Elbit Computers Ltd.: *See—*
Sobel, Amos, 4,686,772, Cl. 33-333.000.

Electric Power Research Institute, Inc.: *See—*
Marksberry, Clarence L., 4,686,959, Cl. 126-400.000.

Electronic Image Systems, Inc.: *See—*
Holmes, Richard E.; Mays, Joe A.; and Tyler, Michael C., 4,687,973, Cl. 315-371.000.

Electronics and Telecommunication Research Institute: *See—*
Chai, Sang-Hoon; and Lee, Jin-Hyo, 4,686,762, Cl. 437-36.000.

Electronique CKD: *See—*
Picciotto, Robert; Ramel, Francois; Rousseau, Alain; and Touzin, Philippe, 4,687,268, Cl. 439-55.000.

Elektro-Bladh AB: *See—*
Bladh, Ake, 4,686,738, Cl. 16-2.000.

Elektroschmelzwerk Kempten GmbH: *See—*
Hunold, Klaus; Lipp, Alfred; Reinmuth, Klaus; Arnold, Peter; and Napholcz, Johannes, 4,687,655, Cl. 423-344.000.

Elevator GmbH: *See—*
Partanen, Paavo; and Soderena, Soini, 4,687,110, Cl. 212-147.000.

Elf Isolation: *See—*
Couderc, Pierre; and Corbel, Henri, 4,686,803, Cl. 52-97.000.

Ellis, Joseph J., Jr.: *See—*
Carini, Richard P.; Donnelly, James A.; Ellis, Joseph J., Jr.; and Lanzoni, Thomas P., 4,688,033, Cl. 340-800.000.

Elographics, Inc.: *See—*
Talmage, John E., Jr.; and Gibson, William A., 4,687,885, Cl. 178-18.000.

Eltech Systems Corporation: *See—*
Solomon, Frank; Grun, Charles; Abrahamson, Donald W.; Stewart, James J.; and Niksa, Marilyn J., 4,687,553, Cl. 204-16.000.

Ema, Takehiro, to Kabushiki Kaisha Toshiba. X-ray imaging system. 4,688,242, Cl. 378-154.000.

Emenaker, Leo J.: *See—*
Barrus, Gordon B.; and Emenaker, Leo J., 4,687,359, Cl. 400-218.000.

Emergent Technologies Corporation: *See—*
Bersin, Richard L., 4,687,544, Cl. 156-643.000.

Emerson Electric Co.: *See—*
Cunningham, Donald M.; Bartels, Mark A.; and Markum, T. Randall, 4,687,905, Cl. 219-336.000.

Emhart Industries, Inc.: *See—*
Douglas, Robert J.; Doughty, Robert L.; Mungovan, John P.; Andersen, Robert P.; and Abbott, Vaughan, 4,687,502, Cl. 65-164.000.

EMI Limited: *See—*
Ashton, Mark; and Hounsfield, Godfrey N., 4,687,979, Cl. 318-638.000.

Emmenegger, Heinz. Gold alloys and galvanic bath for the electrolytic deposit thereof. 4,687,557, Cl. 204-44.000.

Emoto, Hiroshi: *See—*
Fukushima, Tsunekazu; Emoto, Hiroshi; Kagitani, Yoshio; Yokoyama, Kazumasa; Nishida, Masayuki; and Suyama, Tadakazu, 4,687,762, Cl. 514-34.000.

Emoto, Kazuhiro; Itoh, Akira; and Haino, Kozo, to Mitsubishi Paper Mills, Ltd. Electrophotographic photoreceptor containing a trisazo compound. 4,687,721, Cl. 430-58.000.

Emoto, Masami; and Inuzuka, Hideo, to Ricoh Company, Ltd. Optical pick-up device for both focus and error tracking detection. 4,687,916, Cl. 250-201.000.

Empak, Inc.: *See—*
Mortensen, Roger L., 4,687,097, Cl. 206-334.000.

Ems-Inventia AG: *See—*
Wittwer, Alfred, 4,686,903, Cl. 102-202.500.

Endo, Atsushi: *See—*
Yokota, Yuzo; and Endo, Atsushi, 4,687,388, Cl. 408-230.000.

Endo, Yutaka: *See—*
Tanimoto, Akikazu; Ishizaka, Shoji; Endo, Yutaka; Suzuki, Hiroyuki; and Yanagihara, Masamitsu, 4,687,322, Cl. 355-55.000.

Endorfin, Inc.: *See—*
Ehrenpreis, Seymour; Comaty, Joseph E.; and Balagot, Reuben C., 4,687,781, Cl. 514-557.000.

Engdahl, Holger: *See—*
Lankinen, Matti; Engdahl, Holger; Kohonen, Raimo; Niskanen, Jukka; and Kosonen, Markku, 4,687,583, Cl. 210-739.000.

Engl, Bernhard: *See—*
Biniasz, Franz-Josef; Engl, Bernhard; Fuchs, Axel; and Huser, Margit, 4,687,525, Cl. 148-336.000.

Enichem, S.p.A.: *See—*
Kosinska, Wanda; Grzelak, Dorota; Penczek, Irena; and Bialy, Jan, 4,687,799, Cl. 524-100.000.

Enso-Gutzeit Oy: *See—*
Lankinen, Matti; Engdahl, Holger; Kohonen, Raimo; Niskanen, Jukka; and Kosonen, Markku, 4,687,583, Cl. 210-739.000.

Enushii Shangyo Co., Ltd.: *See—*
Shiraishi, Takashi; and Kitamura, Shiro, 4,687,328, Cl. 356-384.000.

Ergenics, Inc.: *See—*
Golben, Peter M., 4,687,049, Cl. 165-1.000.
Goodell, Paul D.; Huston, Ernest L.; Rudman, Peter S.; and Sandrock, Gary D., 4,687,650, Cl. 423-248.000.

Erickson, Bert K., to General Electric Company. Secure wireless communication system utilizing locally synchronized noise signals. 4,688,257, Cl. 380-48.000.

Ericsson Paging Systems B.V.: *See—*
de Graaf, Cornelis C., 4,688,034, Cl. 340-825.480.

Eriksson, Lars; and Knight, Brian V., to Orfus Limited. Roof structure. 4,686,801, Cl. 52-81.000.

Eriksson, Magnus: *See—*
Szendroi, Balint; and Eriksson, Magnus, 4,687,175, Cl. 248-661.000.

Eriksson, Rune, to AB Innomatic. Method and apparatus for measuring the streaming potential of a particle suspension. 4,687,986, Cl. 324-71.100.

Erndt, Hans: *See—*
Palloch, Herbert; and Erndt, Hans, 4,687,461, Cl. 474-148.000.

Erno Raumfahrttechnik GmbH: *See—*
Hosemann, Rolf; Mayland, Walter; and Walter, Juergen, 4,688,240, Cl. 378-70.000.

Ernst, Hans-Hellmut; and Lochbihler, Edmund, to Britax-Kolb GmbH & Co. Safety-belt system. 4,687,253, Cl. 297-478.000.

Eron, Murat, to RCA Corporation. Lift-off technique for producing metal pattern using single photoresist processing and oblique angle metal deposition. 4,687,730, Cl. 430-324.000.

Erowa AG: *See—*
Schneider, Rudolf, 4,686,768, Cl. 33-172.00B.

Esche, John C., to Milsco Manufacturing Company. Adjustable seat assembly for vehicle. 4,687,250, Cl. 297-320.000.

Eschenweck, Dieter: *See—*
Weiss, Franz; Eschenweck, Dieter; and Stark, Manfred, 4,687,043, Cl. 164-97.000.

Escobal, Peter R. Apparatus and method for pumping air. 4,687,494, Cl. 55-37.000.

Essex Specialty Products, Inc.: *See—*
Rizk, Sidky D.; and Hsieh, Harry W. S., 4,687,533, Cl. 156-307.300.

ETA SA Fabriques d'Ebauches: *See—*
Muller, Jacques; and Cassani, Alexandre, 4,687,341, Cl. 368-109.000.

Etablissement Public de Diffusion Dit "Telediffusion de France": *See—*
Blineau, Joseph; Pommier, Daniel; and Thomas, Claude, 4,688,218, Cl. 370-106.000.

Etona Company, Limited: *See—*
Ebihara, Yoshiyuki, 4,687,098, Cl. 206-340.000.

Euzen, Jean P.: *See—*
Quang, Dang V.; Pradel, Claude; Euzen, Jean P.; and Le Page, Jean-Francois, 4,687,656, Cl. 423-361.000.

Evans, Brian K.: *See—*
Rhodes, John; and Evans, Brian K., 4,687,667, Cl. 424-195.100.

Evans, John M., to Beecham Group p.l.c. Chromanol derivatives. 4,687,779, Cl. 514-456.000.

Evans, Robert F., to Varel Manufacturing Company. Rock bit circulation nozzle. 4,687,066, Cl. 175-340.000.

Evans, Robert G. Method and apparatus for testing drums. 4,686,850, Cl. 73-45.500.

Everett, Nicholas P.: *See—*
Paterson, Karol E.; and Everett, Nicholas P., 4,687,743, Cl. 435-240.490.

EVVA-Werk Spezialerzeugung von Zylinder- und Sicherheitsschlossern Gesellschaft mbH & Co. Kommanditgesellschaft: *See—*
Prunbauer, Kurt; and Csapo, Erich, 4,686,841, Cl. 70-276.000.

Ex-Cell-O Corporation: *See—*
Prendergast, William M.; and Margolien, Daniel J., 4,686,730, Cl. 15-93.00R.

Exide Corporation: *See—*
Chreitzberg, Augustus M.; and Chiacchio, Frank J., 4,687,718, Cl. 429-190.000.

Exxon Research and Engineering Company: *See—*
Fiato, Rocco A.; Rice, Gary W.; Miseo, Sabato; and Soled, Stuart L., 4,687,753, Cl. 502-5.000.
Oswald, Alexis A.; Jermasen, Torris G.; Westner, Andrew A.; and Huang, I-Der, 4,687,866, Cl. 556-18.000.
Oswald, Alexis A.; Jermasen, Torris G.; Westner, Andrew A.; and Huang, I-Der, 4,687,874, Cl. 568-454.000.
van der Vleugel, Dominicus J. M.; Hoving, Klaas; Wortel, Theodorus M.; Rosensweig, Ronald E.; and Rees, Lovat V. C., 4,687,878, Cl. 585-820.000.

Ezzell, Bobby R.; Carl, William P.; and Mod, William A., to Dow Chemical Company, The. Preparation, decarboxylation and polymerization of novel acid fluorides and resulting monomers. 4,687,821, Cl. 526-247.000.

Faasse, Gene E., to Steel Heddle Manufacturing Co. Heddle frame for a high speed weaving machine. 4,687,030, Cl. 139-91.000.

Fairchild Semiconductor Corporation: *See—*
Phy, William S., 4,688,075, Cl. 357-80.000.

Falk, Charles D.; and Davis, Lincoln R., to Lopat Industries, Inc. Composition to encapsulate toxic metal and/or organic pollutants from wastes. 4,687,373, Cl. 405-128.000.

Fanuc Ltd.: *See—*
Yamazaki, Etuo, 4,688,179, Cl. 364-474.000.

Farag, Samir F.: *See—*
Kleinecke, John D.; Farag, Samir F.; and Little, Thomas R., 4,688,144, Cl. 361-345.000.

Farber, Karlheinz: *See—*
Eichler, Walter; Farber, Karlheinz; and Fischer, Elisabeth, 4,687,909, Cl. 219-502.000.

Farrell, Roberta L.; Kirk, Thomas K.; and Tien, Ming, to Repligen Corporation; and United States of America, Agriculture. Novel enzymes which catalyze the degradation and modification of lignin. 4,687,741, Cl. 435-189.000.

Farrell, Roberta L., to Repligen Corporation. Use of rLDM TM 1-6 and other ligninolytic enzymes in the treatment of mechanical pulps. 4,687,745, Cl. 435-278.000.

Fawzi, Mahdi B.: *See—*
Chow, Li Hang; Fawzi, Mahdi B.; and Ghebre-Sellassie, Isaac, 4,687,776, Cl. 514-312.000.

Fehrenbach, Hubert: *See—*
Gruehn, Dietrich; Fehrenbach, Hubert; and Holl, Norbert, 4,688,129, Cl. 360-133.000.

Feldman, Rubin: *See—*
Parker, John A.; Feldman, Rubin; and Bryant, Robert L., 4,687,651, Cl. 423-315.000.
Parker, John A.; Feldman, Rubin; and Bryant, Robert L., 4,687,785, Cl. 521-106.000.

Fellinger, Christine: *See—*
Tihanyi, Jenoe; Fellinger, Christine; and Leipold, Ludwig, 4,688,071, Cl. 357-41.000.

Felsch, Bernhard: *See—*
Klanner, Wilfried; Schmaler, Dieter H.; Wetter, Hermann; Felsch, Bernhard; and Czernakowski, Waldemar, 4,687,255, Cl. 297-488.000.

Fender, C. Leo. Electromagnetic pickup for stringed musical instruments. 4,686,881, Cl. 84-1.150.

Fendley, James R., to Zenith Electronics Corporation. Color CRT purity measurement. 4,688,079, Cl. 358-10.000.

Fenrich, William G., to Brunswick Corporation. Staged hydraulic trim-tilt system. 4,687,449, Cl. 440-61.000.

Fenyo, Marta; Kertesz, Ivan; Rozsa, Karoly; and Szego, Peter. Method and apparatus for promoting healing. 4,686,986, Cl. 128-396.000.

Ferguson, Michael R.: *See—*
Hartz, James F.; Bazilio, Rayman E.; and Ferguson, Michael R., 4,687,071, Cl. 180-9.100.

Ferguson, Patrick E.; and Nordquist, Andrew L., to Varian Associates, Inc. Triple-pane waveguide window. 4,688,009, Cl. 333-252.000.

Ferrante, Ronald A., to NCR Corporation. Method and apparatus for making and utilizing a holographic bifocal lens element. 4,687,282, Cl. 350-3.700.

Ferrari, Harry M., to Westinghouse Electric Corp. Nuclear fuel assembly with improved spectral shift-producing rods. 4,687,621, Cl. 376-209.000.

Ferrari, Harry M.: *See—*
Wilson, John F.; Gjertsen, Robert K.; and Ferrari, Harry M., 4,687,631, Cl. 376-446.000.

Ferrell, Charles W.; and Howell, Thomas H., to Honeywell Bull Inc. Division by a constant by iterative table lookup. 4,688,186, Cl. 364-764.000.

Ferrofluidics Corporation: *See—*
Borduz, Lucian; and Raj, Kuldip, 4,687,596, Cl. 252-510.000.

Fiato, Rocco A.; Rice, Gary W.; Miseo, Sabato; and Soled, Stuart L., to Exxon Research and Engineering Company. Laser produced iron carbide-based catalysts. 4,687,753, Cl. 502-5.000.

Fichtel & Sachs AG: *See—*
Tebbe, Gerhard, 4,687,087, Cl. 192-106.200.

Fiechter, Manuel S.: *See—*
Goslowsky, Hans; Lewerenz, Hans-Joachim; Fiechter, Manuel S.; and Husemann, Karl-Dieter, 4,687,881, Cl. 136-255.000.

Figgie International Inc.: *See—*
Schillaci, Samuel P., 4,687,640, Cl. 422-120.000.

Fimtessile Fabbrica Italiana Macchinario Tessile S.p.A.: *See—*
Cremonesi, Gianluigi, 4,687,028, Cl. 139-71.000.

Finch, Hilvan A., to United States of America, Energy. Brush potential curve tracer. 4,687,990, Cl. 324-158.0MG.

Fine Organics Limited: *See—*
Hollowood, John; Jackson, Arthur; and Heyes, Graham, 4,687,845, Cl. 544-54.000.

First Brands Corporation: *See—*
Haack, John L., 4,687,590, Cl. 252-75.000.

Fischer, Elisabeth: *See—*
Eichler, Walter; Farber, Karlheinz; and Fischer, Elisabeth, 4,687,909, Cl. 219-502.000.

Fischer, Ludwig: *See—*
Bohg, Armin; Fischer, Ludwig; Gantz, Bruno; Hartmann, Kurt; and Wolfert, Gerhard, 4,688,012, Cl. 335-276.000.

Fisco Products Limited: *See—*
Burton, Stan, 4,687,155, Cl. 242-107.300.

Fisher Dynamics Corporation: *See—*
Bell, Robert L.; and Secord, Tyrone R., 4,687,252, Cl. 297-374.000.

Fisher, John; and Wheatley, David J., to University of Glasgow, University Court of the. Heart valve prosthesis. 4,687,483, Cl. 623-2.000.

Fluid Power Components, Inc.: *See—*
Budzich, Tadeusz, 4,687,572, Cl. 210-114.000.

Flukiger, Rene; and Gauss, Stephen, to Kernforschungszentrum Karlsruhe GmbH. Method for producing superconductive wires. 4,687,883, Cl. 174-126.00S.

Flygt AB: *See—*
Szendroi, Balint; and Eriksson, Magnus, 4,687,175, Cl. 248-661.000.

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Biolchini, Robert J.; Boward, Willard L., Jr.; and Wang, Kuei-Hsiung, 4,687,648, Cl. 423-242.000.
Brolin, Charles A.; Jennerjohn, Dennis A.; and Moeller, Richard E., 4,687,892, Cl. 219-8.500.
Caserza, David D.; and Russell, John W., 4,686,886, Cl. 89-11.000.

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Pettingell, Winslow L., 4,686,932, Cl. 118-419.000.

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Cavasa, Victor; and Fontaine, Jean-Marc, 4,686,825, Cl. 60-243.000.

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Edridge, Michael J., 4,688,259, Cl. 455-12.000.
Kamel, Ahmed A.; Graul, Donald W.; Chan, Fred N. T.; and Gamble, Donald W., 4,688,091, Cl. 358-109.000.
Kamel, Ahmed A.; Graul, Donald W.; Savides, John; and Hanson, Charles W., 4,688,092, Cl. 358-109.000.
Plescia, Carl T.; and Gamble, Donald W., 4,687,161, Cl. 244-171.000.

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Beim, Rudolf, 4,686,869, Cl. 74-745.000.
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Ebihara, Ben T.; and Forman, Ralph, 4,687,964, Cl. 313-237.000.

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Heimes, Horst P., 4,687,424, Cl. 417-384.000.

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Salani, Steven J.; and Moffatt, Jeffrey C., 4,686,880, Cl. 84-1.010.

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Foster, Bennie G. Automatic energy saving vent system for air conditioning systems and heating systems. 4,686,892, Cl. 98-107.000.

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Daglish, Alan R.; Foster, Mark H.; and Marwick, William F., 4,687,587, Cl. 252-11.000.

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Fox, Trevor R., to International Computers Limited. Decoder for Manchester encoded data. 4,688,232, Cl. 375-87.000.
Fr. Kammerer GmbH: *See*—
Paulus, Manfred; and Fromel, Norbert, 4,687,053, Cl. 165-133.000.
Fraidlin, Simon, to American Telephone and Telegraph Co., AT&T Bell Labs. Single ended forward converter with resonant commutation of magnetizing current. 4,688,160, Cl. 363-21.000.
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Helary, Jean-Louis E.; and Grenon, Pierre, 4,687,174, Cl. 248-638.000.
Francois-Noel, Richard, to Vesuvius International Corporation. Gripping device for a wearing element. 4,687,186, Cl. 266-287.000.
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Frank, Paul C. Hydraulic bench press. 4,686,897, Cl. 100-214.000.
Frank, Peter, to Product Innovation Limited. Movement sensor. 4,688,025, Cl. 340-571.000.
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Frater, Georg; Suchy, Milos; Wenger, Jean; and Winternitz, Paul, to Hoffmann-La Roche Inc. [(Isopropylideneamino)oxy}-ethyl-2-[[6-chloroquinoxalinyl)oxy]phenoxy]propionate postemergent herbicide. 4,687,849, Cl. 544-354.000.
Frayer, Paul D., to Rogers Corporation. Encapsulated electroluminescent lamp. 4,687,968, Cl. 313-509.000.
Freeman, LeRoy M., to Slater Electric Inc. Electronic detection circuit for a ground fault circuit interrupter. 4,688,133, Cl. 361-45.000.
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Freudenberg, Tillmann, to Carl Freudenberg, Firma. Mount. 4,687,171, Cl. 248-550.000.
Frey, Otto, to Silver Brothers Limited. Femur head prosthesis. 4,687,488, Cl. 623-22.000.
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Bruer, Dirk; Tooten, Karl-Heinz; and Freye, Theo, 4,686,812, Cl. 53-118.000.
Fricke, Walter, to Blaupunkt-Werke GmbH. Method and apparatus for recording a video signal without loss of a sound signal recorded on the same tracks. 4,688,110, Cl. 360-19.100.
Fricker, Hans, to Sulzer-Ruti Machinery Work Ltd. Support system for coiled tube bunch of a heat exchanger. 4,687,052, Cl. 165-82.000.
Friedman, James A.: *See*—
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Ross, Richard S.; Friedman, John E.; and Friedman, James A., 4,687,248, Cl. 297-129.000.
Friedrich Grohe Armaturenfabrik GmbH & Co.: *See*—
Kahle, Dieter; Humpert, Jurgen; and Pawelzik, Manfred, 4,687,025, Cl. 137-625.170.
Friesdorf, Jakob: *See*—
Berscheid, Peter; and Friesdorf, Jakob, 4,687,530, Cl. 156-215.000.
Frisch, Eldon E., to Dow Corning Corporation. Method of making an intramedullary bone plug and bone plug made thereby. 4,686,973, Cl. 128-92.0YZ.
Frister, Manfred, to Robert Bosch GmbH. Method and apparatus to reduce operating noise of dynamo electric machines, particularly vehicular three-phase alternators. 4,687,960, Cl. 310-42.000.
Fritsche, Karl; and Vahs, Wilhelm, to Geze GmbH. Door closer. 4,686,739, Cl. 16-79.000.
Fromel, Norbert: *See*—
Paulus, Manfred; and Fromel, Norbert, 4,687,053, Cl. 165-133.000.
Frutschi, Hansulrich, to BBC Brown, Boveri & Company Limited. Gas turbine power station with air storage and method for operating the same. 4,686,822, Cl. 60-39.020.
Fryer, Warren R., to Calculagraph Company. Demultiplexer for two-stage framing. 4,688,215, Cl. 370-102.000.
Fuchs, Axel: *See*—
Biniasz, Franz-Josef; Engl, Bernhard; Fuchs, Axel; and Huser, Margit, 4,687,525, Cl. 148-336.000.
Fuchs, Francis J., Jr. Continuous extrusion apparatus. 4,687,422, Cl. 417-345.000.
Fuhrer, Gerd: *See*—
Osterloff, Kurt; and Fuhrer, Gerd, 4,687,081, Cl. 192-53.00F.
Fuji Photo Film Co., Ltd.: *See*—
Aagano, Toshitaka; and Takasaki, Yoshimi, 4,687,937, Cl. 250-484.100.
Akao, Mutsuo, 4,687,692, Cl. 428-137.000.
Miyakawa, Tadashi, 4,687,334, Cl. 356-404.000.
Miyakawa, Tadashi, 4,687,974, Cl. 315-375.000.
Miyatsuka, Hajime; Kasuga, Akira; Matsufuji, Akihiro; and Kakuta, Takeshi, 4,687,705, Cl. 428-329.000.
Miyoshi, Takahito; and Fujiyama, Masaaki, 4,687,703, Cl. 428-323.000.
Miyoshi, Takahito; Matsufuji, Akihiro; Yamamoto, Nobuyuki; Miyatsuka, Hajime; and Fujiyama, Masaaki, 4,687,704, Cl. 428-328.000.
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Ogawa, Hiroshi; Saito, Shinji; Mizuno, Chiaki; and Tamai, Yasuo, 4,687,710, Cl. 428-447.000.
Oishi, Kengo; and Ono, Tuyoshi, 4,688,127, Cl. 360-132.000.
Tamura, Kaoru; Takano, Masao; and Kimura, Tsutomu, 4,687,932, Cl. 250-327.200.
Toyama, Tadao; Kobayashi, Kesanao; Koike, Mitsuru; and Tamoto, Koji, 4,687,727, Cl. 430-175.000.
Fuji Techno Kogyo Kabushiki Kaisha: *See*—
Yoshimura, Hiroichi, 4,687,426, Cl. 417-539.000.
Fuji Xerox Company, Limited: *See*—
Shimizu, Norimitsu, 4,687,971, Cl. 315-244.000.
Fuji Xerox Co., Ltd: *See*—
Fujimura, Yoshihiko; Saitoh, Koichi; and Suemitsu, Yuji, 4,686,933, Cl. 118-623.000.
Fujii, Katsumasa: *See*—
Sato, Toru; Okazaki, Naoto; Hasegawa, Toshihisa; Fujii, Katsumasa; and Takano, Kazukiyo, 4,686,974, Cl. 128-204.230.
Fujii, Tatsuo: *See*—
Ozu, Tadahiro; Nakayama, Nobuyoshi; and Fujii, Tatsuo, 4,687,136, Cl. 239-8.00X.
Fujii, Teruo, to Dainippon Screen Mfg. Co., Ltd. Rotary suction drum. 4,687,323, Cl. 355-73.000.
Fujii, Yoshihalu, to Sharp Kabushiki Kaisha. Temperature controller with shape memory alloy in a fixing device of electrophotographic copying machine. 4,687,315, Cl. 355-3.0FU.
Fujiie, Kazuhiko: *See*—
Terayama, Yasunori; Nakamura, Masashi; Fujiie, Kazuhiko; and Yoshitoshi, You, 4,687,296, Cl. 350-247.000.
Fujimura, Itaru: *See*—
Ohshima, Kohichi; Kageyama, Yoshiyuki; Ide, Yukio; Fujimura, Itaru; and Kunita, Masako, 4,687,723, Cl. 430-65.000.
Fujimura, Yoshihiko; Saitoh, Koichi; and Suemitsu, Yuji, to Fuji Xerox Co., Ltd. Magnetic recording image developing apparatus. 4,686,933, Cl. 118-623.000.
Fujishima, Nobuichi; Nakano, Hideharu; and Ochi, Shuhei, to Matsushita Electric Works, Ltd. Portable electric hair dryer with electric shock protection circuit. 4,687,906, Cl. 219-364.000.
Fujita, Takeshi: *See*—
Meguro, Kanji; and Fujita, Takeshi, 4,687,777, Cl. 514-342.000.
Fujitsu Limited: *See*—
Kawaguchi, Tomohiro, 4,688,208, Cl. 370-15.000.
Ono, Izumi, 4,688,147, Cl. 361-385.000.
Takemae, Yoshihiro, 4,688,219, Cl. 371-10.000.
Wakabayashi, Tetsushi; Sugimoto, Masahiro; and Muratake, Kiyoshi, 4,688,077, Cl. 357-81.000.
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Miyoshi, Takahito; and Fujiyama, Masaaki, 4,687,703, Cl. 428-323.000.
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Fukada, Tsuyoshi: *See*—
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Fukatsu, Shunzo: *See*—
Yamamoto, Yuichi; Yoshida, Takashi; Fukatsu, Shunzo; and Ishimaru, Toshiyasu, 4,687,769, Cl. 514-202.000.
Fukazawa, Toshihiko: *See*—
Takai, Kazuki; Ito, Yukio; Kinoshita, Shigeo; Kikuchi, Junichi; and Fukazawa, Toshihiko, 4,688,122, Cl. 360-96.500.
Fukuchi, Hiromichi: *See*—
Uematsu, Ryosuke; Ushioda, Toyoji; and Fukuchi, Hiromichi, 4,688,048, Cl. 346-1.100.
Fukuda, Hiroyuki: *See*—
Shigeta, Masatomo; Saitoh, Kuniyuki; and Fukuda, Hiroyuki, 4,687,607, Cl. 264-29.500.
Fukuda, Yukihiro: *See*—
Aoki, Takashi; Sato, Yoichi; and Fukuda, Yukihiro, 4,686,872, Cl. 74-869.000.
Fukuhara, Satoru; and Todokoro, Hideo, to Hitachi, Ltd. Scanning electron microscope. 4,687,931, Cl. 250-310.000.
Fukui, Hisatoshi: *See*—
Maeda, Hirofumi; Nakamura, Kyoichi; and Fukui, Hisatoshi, 4,687,641, Cl. 422-133.000.
Fukuroi, Takeo; and Tanaka, Akira, to Yoshida Kogyo K.K. Capped eyelet for attaching snap fastener. 4,686,749, Cl. 24-691.000.
Fukushima, Tsunekazu; Emoto, Hiroshi; Kagitani, Yoshio; Yokoyama, Kazumasa; Nishida, Masayuki; and Suyama, Tadakazu, to Green Cross Corporation. Water soluble drug complex and method for production of same. 4,687,762, Cl. 514-34.000.
Fukuyama, Goro: *See*—
Hashimoto, Kazuyoshi; Nakano, Tsuneo; Arita, Kazutoyo; Fukuyama, Goro; and Shimosato, Yoshio, 4,687,125, Cl. 226-21.000.
Fulkerson, David E.; and Geske, Marvin L., to Wolff, George D. Position sensor for a fuel injection element in an internal combustion engine. 4,687,994, Cl. 324-251.000.
Fullemann, Jorg, to VTH AG. Device for heating a fluid and for cleaning waste gases from heating systems. 4,686,940, Cl. 122-31.00R.

Funk, Kent D.: *See*—
Andra, Bryan K.; Funk, Kent D.; Lang, Clyde J.; and Todd, Philip, 4,686,820, Cl. 56-341.000.

Funston, David L., to Eastman Kodak Company. Illumination control circuitry for a film video player electronic strobe light. 4,688,099, Cl. 358-214.000.

Furneaux, Robin C.; Rigby, William R.; and Davidson, Alexander P., to Alcan International Limited. Porous films and method of forming them. 4,687,551, Cl. 204-11.000.

Furrow, Roger W.; Young, Harold R.; and Dye, G. Frank, to Gilbarco, Inc. Venturi liquid evacuator system for maintaining clear vapor path in vapor recovery hose. 4,687,033, Cl. 141-59.000.

Furuhata, Takashi; and Owashi, Hitoaki, to Hitachi, Ltd. Apparatus for correcting time base error of video signal. 4,688,081, Cl. 358-19.000.

Furukawa, Yoshimi: *See*—
Kawamoto, Yoshimich; Furukawa, Yoshimi; Hamada, Tetsuro; and Serizawa, Mitsuya, 4,687,216, Cl. 280-91.000.

Fushida, Akira: *See*—
Matsui, Toshikazu; Fushida, Akira; Honda, Nobuyasu; Nakao, Minoru; and Tsuji, Nobuyuki, 4,686,935, Cl. 118-658.000.

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Kawasaki, Hiroaki; and Kanetsuna, Nobumitsu, 4,688,029, Cl. 340-754.000.
Suzuki, Nobuhiro, 4,687,975, Cl. 318-261.000.

Futamura, Shoji: *See*—
Ozaki, Sei; Futamura, Shoji; Kojima, Masaru; and Inoue, Satoru, 4,687,433, Cl. 425-464.000.

G. D. Searle & Co.: *See*—
Adelstein, Gilbert W.; Moormann, Alan E.; and Yu, Stella S. T., 4,687,775, Cl. 514-300.000.
Djuric, Stevan W.; Chinn, Leland J.; and Rorig, Kurt J., 4,687,864, Cl. 549-414.000.

GA Technologies Inc.: *See*—
Chan, Vincent S.; Chiu, Shiu-Chu; and Ohkawa, Tihiro, 4,688,227, Cl. 372-2.000.

Gaastra Sails International Limited: *See*—
Magnan, Jeffrey J., 4,686,921, Cl. 114-102.000.

Gabor, Andrew: *See*—
Crystal, Richard G.; and Gabor, Andrew, 4,686,900, Cl. 101-93.480.

Gadde, Villy, to Safe Bridge AB. Barrier arrangement and a method for producing the same. 4,688,024, Cl. 340-550.000.

Gagnon, Peter R.; Griffin, Robert M.; and Kimball, Stephen F., to GTE Products Corporation. Tungsten-halogen electric lamp with permeable means closing an outer envelope. 4,687,963, Cl. 313-17.000.

Gaiser, Dieter: *See*—
Schoettle, Klaus; Buhk, Artur; Kamm, Eugen; Berger, Heinz; and Gaiser, Dieter, 4,687,157, Cl. 242-199.000.

Gall, Rudi: *See*—
Bosies, Elmar; and Gall, Rudi, 4,687,767, Cl. 514-89.000.

Galvin, Aaron A.; Mason, Douglas L.; Leff, Kenneth J.; Schide, John N.; and Giffone, Ralph A., to ADT Inc. Modular transceiver with adjustable specular member. 4,687,924, Cl. 250-216.000.

Gamble, Donald E.; Hunter, Harry L.; and McKinney, Gordon R., to Bristol-Myers Company. Method for treatment of male impotence. 4,687,771, Cl. 514-253.000.

Gamble, Donald W.: *See*—
Kamel, Ahmed A.; Graul, Donaid W.; Chan, Fred N. T.; and Gamble, Donald W., 4,688,091, Cl. 358-109.000.
Plescia, Carl T.; and Gamble, Donald W., 4,687,161, Cl. 244-171.000.

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Schroder, Ulf, 4,687,748, Cl. 436-526.000.

Gantz, Bruno: *See*—
Bohg, Armin; Fischer, Ludwig; Gantz, Bruno; Hartmann, Kurt; and Wolfert, Gerhard, 4,688,012, Cl. 335-276.000.

Garda, Alexandr P.: *See*—
Nevgod, Vasily A.; Garda, Alexandr P.; and Kadyrov, Valery K., 4,687,135, Cl. 239-81.000.

Garner, Daniel C.: *See*—
Gillett, James E.; Garner, Daniel C.; and Sherwood, Donald G., 4,687,628, Cl. 376-353.000.

Garner, H. Douglas, to United States of America, National Aeronautics & Space Administration. Braille reading system. 4,687,444, Cl. 434-114.000.

Garner, Terry N.: *See*—
Schaefer, Henry A.; and Garner, Terry N., 4,688,262, Cl. 455-89.000.

Garretson, Jay H.: *See*—
Plyler, Robert G.; and Garretson, Jay H., 4,687,270, Cl. 439-350.000.

Garrison, John D., to Garrison, John D. Integrated solar thermal energy collector system. 4,686,961, Cl. 126-433.000.

Garza, Irene E.: *See*—
Coleman, Ann C.; and Garza, Irene E., 4,686,713, Cl. 2-12.000.

Gatti, Emilio: *See*—
Rehak, Pavel; and Gatti, Emilio, 4,688,067, Cl. 357-29.000.

Gatti, Irene, heir: *See*—
Taramasso, Marco, deceased; Notari, Bruno; Manara, Giovanni; and Bellussi, Giuseppe, 4,687,654, Cl. 423-329.000.

Gatto, Vincent J.: *See*—
Gokel, George W.; and Gatto, Vincent J., 4,687,844, Cl. 540-467.000.

Gauss, Stephen: *See*—
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Gawley, Robin A.: *See*—
Keller, Paul R. N.; Gawley, Robin A.; and Stewart, Ian M., 4,688,106, Cl. 358-342.000.

Geka, Toshiaki, to Nippon Thompson Co., Ltd. Linear motion roller bearing assembly having a roller separator. 4,687,345, Cl. 384-44.000.

Gelo, Mark A.; and Hirshberg, Moshe J., to Orion Research Inc. Method for manufacturing an ion-sensitive electrode. 4,687,500, Cl. 65-36.000.

Genco, Louis V.: *See*—
Task, Harry L.; and Genco, Louis V., 4,687,338, Cl. 356-446.000.

General Company Limited: *See*—
Ueyama, Seiji, 4,688,057, Cl. 503-204.000.

General Dynamics, Pomona Division: *See*—
Piesik, Edward T., 4,686,884, Cl. 89-1.816.
Wedertz, Larry D.; Ross, Oakley G.; and Kristedja, David H., 4,688,040, Cl. 342-3.000.

General Electric Company: *See*—
Brahmavar, Subhash M.; and Litch, Ernest W., III, 4,687,977, Cl. 318-492.000.
Cline, John A.; and Iuliano, William N., 4,687,410, Cl. 415-17.000.
Corby, Nelson R., Jr., 4,687,325, Cl. 356-1.000.
Corby, Nelson R., Jr., 4,687,326, Cl. 356-5.000.
Erickson, Bert K., 4,688,257, Cl. 380-48.000.
Hayes, John J.; and Troutman, Dennis L., 4,688,249, Cl. 380-20.000.
Hepp, Leonard R., 4,687,802, Cl. 524-411.000.
Howell, Edward K., 4,687,950, Cl. 307-642.000.
Lillquist, Robert D., 4,687,344, Cl. 374-124.000.
Newmark, Larry J.; and Hibbert, David A., 4,688,146, Cl. 361-364.000.
Quinn, Clayton B.; and Holub, Fred F., 4,687,819, Cl. 525-425.000.
Schaefer, Henry A.; and Garner, Terry N., 4,688,262, Cl. 455-89.000.
Talento, Joseph L., 4,687,515, Cl. 75-246.000.

General Motors Corporation: *See*—
Aldridge, Fredrick A., 4,688,263, Cl. 455-142.000.
Hartz, James F.; Bazilio, Rayman E.; and Ferguson, Michael R., 4,687,071, Cl. 180-9.100.
Plyler, Robert G.; and Garretson, Jay H., 4,687,270, Cl. 439-350.000.

Genna, Robert T. Mechanical and acoustical vibration reduction apparatus for turntables and speaker enclosures. 4,687,173, Cl. 248-603.000.

Geo-Centers, Inc.: *See*—
Mermelstein, Marc D., 4,687,993, Cl. 324-244.000.

George Hartmann GmbH & Co. KG: *See*—
Hartmann, Hans, 4,687,231, Cl. 283-82.000.

George Koch Sons, Inc.: *See*—
Stofleth, David F.; and Muehlbauer, James H., 4,687,686, Cl. 427-421.000.

Georgia Kaolin Company, Inc.: *See*—
Willis, Mark S., 4,687,546, Cl. 159-2.100.

Georgia Tech Research Corporation: *See*—
Browner, Richard F.; and Willoughby, Ross C., 4,687,929, Cl. 250-282.000.

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Freeman, LeRoy M.; Gernhardt, Paul D.; and Orbeta, Ferdinand E., 4,688,134, Cl. 361-45.000.

Gerstein, Milton S.: *See*—
Giammarese, Victor, 4,688,038, Cl. 340-870.020.

Geske, Marvin L.: *See*—
Fulkerson, David E.; and Geske, Marvin L., 4,687,994, Cl. 324-251.000.

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Fritsche, Karl; and Vahs, Wilhelm, 4,686,739, Cl. 16-79.000.

Ghassemi, Farhad: *See*—
Moore, John S.; and Ghassemi, Farhad, 4,687,057, Cl. 166-252.000.

Ghebre-Sellassie, Isaac: *See*—
Chow, Li Hang; Fawzi, Mahdi B.; and Ghebre-Sellassie, Isaac, 4,687,776, Cl. 514-312.000.

Ghommidh, Charles; Navarro, Jean-Marie; Girardon, Philippe; and Amen, Jean, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Continuous microbiological production of acetic acid and vinegar. 4,687,668, Cl. 426-17.000.

Ghyczy, Miklos: *See*—
Wendel, Armin; Leyck, Sigurd; Wetzig, Helmut; Hager, Jorg; Durr, Manfred; and Ghyczy, Miklos, 4,687,766, Cl. 514-78.000.

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Gianolini, Giovanni: *See*—
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Gianturco, Cesare, to Cook, Incorporated. Implantable insulin administration device. 4,687,468, Cl. 604-153.000.

Gibbons, Ian: *See*—
DiNello, Robert K.; Gibbons, Ian; and Ullman, Edwin F., 4,687,735, Cl. 435-7.000.

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Hall, George D., to American Sterilizer Company. Variable height column with integral actuating means. 4,686,889, Cl. 92-117.00A.

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Clarke, John; D'Eath, Roderick M.; and Haycock, Derek E., 4,687,612, Cl. 264-322.000.

Hayes, David V., to Corning Glass Works. Electrochemical machine apparatus with drill-depth and rate monitor. 4,687,563, Cl. 204-224.00M.

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Haylock, John C.: *See*—
Dunkle, Steven R.; and Haylock, John C., 4,687,795, Cl. 523-436.000.

Hayman, Cecil: *See*—
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Header, Stephen; Moore, Jerry L.; and Taylor, Attalee S., to AMP Incorporated. Circuit board edge connector. 4,687,267, Cl. 439-62.000.

Heath, Herbert E.; and Block, Jay M., to Hughes Aircraft Company. Hierarchical configurable gate array. 4,688,072, Cl. 357-45.000.

Heaton, Harley L., III; Lippold, Joseph H., Jr.; McHale, Edward T.; and Skolnik, Edward G., to Atlantic Research Corporation. Process for controlling the viscosity and stability of a coal-water fuel slurry. 4,687,490, Cl. 44-51.000.

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Leisman, Gerald; and Hed, A. Zeev, 4,686,983, Cl. 128-325.000.

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Heidrich, Gunther. Soundproofed gear box. 4,686,868, Cl. 74-606.00R.

Heimes, Horst P., to Forschungsgesellschaft Fuer Biomedizinische Technik E.V. Redundant piston pump for the operation of single or multiple chambered pneumatic blood pumps. 4,687,424, Cl. 417-384.000.

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Helary, Jean-Louis E.; and Grenon, Pierre, to Framatome & Cie. Device for centering and guiding a roller supporting a heavy component. 4,687,174, Cl. 248-638.000.

Held, Kurt. Process and device for fabrication of copper-lined laminates. 4,687,528, Cl. 156-150.000.

Hellman, Goran, to Munters Corporation, The. Water treatment system. 4,687,574, Cl. 210-151.000.

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Coburn, Arthur E.; and Deal, Roger, 4,687,559, Cl. 204-110.000.

Helt, Robert W., to American Standard Inc. Dual mode controller for assigning operating priority of two loads. 4,687,948, Cl. 307-38.000.

Henderson, David: *See*—
Bowen, Howard; Henderson, David; and Olson, Carl, 4,687,943, Cl. 250-570.000.

Henderson, Roger L.: *See*—
Richards, Walter L.; Henderson, Roger L.; Aul, George N.; and Pauley, Barry W., 4,687,060, Cl. 166-285.000.

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Gordon, Jerry D., 4,686,896, Cl. 99-482.000.

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Henzi, Beat, to Sandoz Ltd. Monoazo compounds having an imidazolium-2 group linked through an azo radical to a substituted phenyl group. 4,687,842, Cl. 534-607.000.

Hepp, Leonard R., to General Electric Company. Glass fiber reinforced polyester molding compositions containing metal salts. 4,687,802, Cl. 524-411.000.

Herdeg, Donald F.; and Ciccia, Lawrence P., to USM Corporation. Sewing machine system having automatic processing of sewn work. 4,686,915, Cl. 112-121.120.

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Herman, Kark W., to Drew Chemical Corporation. Process and apparatus for measuring corrosion rate of a heat transfer surface. 4,686,854, Cl. 73-86.000.

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Oloff, Clarence M.; Hermann, Linda M.; Moss, William G.; and Sims, Steven R., 4,686,997, Cl. 128-653.000.

Herz, Jean: *See*—
Chaumont, Philippe; Beinert, Gerard; Herz, Jean; and Rempp, Paul, 4,687,814, Cl. 525-242.000.

Hess, Heinz, to Robert Bosch GmbH. Circuit arrangement for matrixing three chroma signals to obtain color difference and a luminance signal. 4,688,083, Cl. 358-30.000.

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Knowles, Vernon L.; Wilcox, Roger V.; and Jackson, Bruce J., 4,688,118, Cl. 360-75.000.
Towner, David K.; and Campbell, David K., 4,688,201, Cl. 369-44.000.

Heyes, Graham: *See*—
Hollowood, John; Jackson, Arthur; and Heyes, Graham, 4,687,845, Cl. 544-54.000.

Hibbert, David A.: *See*—
Newmark, Larry J.; and Hibbert, David A., 4,688,146, Cl. 361-364.000.

Hida, Takao: *See*—
Odasima, Suzuo; Hida, Takao; and Mitamura, Mitsuru, 4,687,333, Cl. 356-382.000.

Hiestand, Karl, to SMW Schneider & Weisshaupt GmbH. Machine tool chuck construction. 4,686,757, Cl. 29-568.000.

Higashiguchi, Shigehiko, to Kabushiki Kaisha Tokyo Horaisha. Method of forming flock patterns. 4,687,527, Cl. 156-72.000.

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McGill, Stephen T.; and McGill, Bette L., 4,688,023, Cl. 340-545.000.

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Okazaki, Susumu; Higuchi, Shunichi; Nakamura, Osamu; and Takahashi, Sachio, 4,687,996, Cl. 324-436.000.

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Hihn, Gerhard: *See*—
Stoll, Kurt; and Hihn, Gerhard, 4,687,189, Cl. 269-22.000.

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Davis, Cecil J.; Matthews, Robert; and Hildenbrand, Randall C., 4,687,542, Cl. 156-643.000.

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Bonnet, Ludwig; and Hiltebrandt, Siegfried, 4,686,965, Cl. 128-4.000.

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Schmidt, Paul J.; and Hung, William M., 4,688,059, Cl. 503-220.000.

Hily, Claude E.; and Michel, Jacqueline-Madeleine, to U.S. Philips Corporation. Device for coupling a light source and an optical waveguide. 4,687,285, Cl. 350-96.180.

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Bothun, Eugene L.; and Hine, Brent S., 4,687,122, Cl. 222-183.000.

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Hinton, Dennis L.: *See*—
Berecz, Imre; and Hinton, Dennis L., 4,687,395, Cl. 411-361.000.

Hinton, James L.: *See*—
LaManna, Richard J.; Hinton, James L.; and Cucksey, Edward L., 4,686,898, Cl. 101-18.000.

Hipp, Betsy: *See*—
Dwyer, John J.; Saltzman, Jeremy; and Hipp, Betsy, 4,688,117, Cl. 360-72.300.

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Knurek, Thomas A.; Houston, Terry L.; and Hipsher, Gary L., 4,687,188, Cl. 267-140.100.

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Koga, Tadao; Sugimori, Mitsuru; Terasaki, Masanori; Maenosono, Tsukasa; Tsushima, Satoru; Yoshida, Kazuo; Kuriwaki, Tetsusho; and Hirado, Miharu, 4,687,894, Cl. 219-10.430.

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Ogibayashi, Shigeaki; Yamada, Mamoru; Mukai, Tatsuo; Tezuka, Makoto; and Hirai, Masazumi, 4,687,047, Cl. 164-476.000.

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Ikeda, Haruhiko; and Hiraishi, Shigetoshi, 4,688,058, Cl. 503-209.000.

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Hiraki, Kazuhiro: *See*—
Shoji, Makoto; Tsuyuguchi, Hiroshi; Toma, Shozo; Hiraki, Kazuhiro; and Morita, Tsutomu, 4,688,112, Cl. 360-60.000.

Hiramatsu, Kenichi; Nozawa, Hidebumi; and Yamauchi, Takashi, to Kasei Verbatim Corporation. Apparatus for centering and attaching a reinforcing ring to a floppy disk. 4,687,536, Cl. 156-556.000.

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Hirata, Koichi: *See*—
Yoshimura, Motokazu; Hirata, Koichi; and Kurebayashi, Kimie, 4,688,192, Cl. 364-900.000.

Hirata, Osamu, to Canon Kabushiki Kaisha. Electronic equipment for storing number of searches of information. 4,688,189, Cl. 364-900.000.

Hirata, Seiichiro, to Mitsubishi Denki Kabushiki Kaisha. Navigator for use aboard a vehicle. 4,688,176, Cl. 364-449.000.

Hirshberg, Moshe J.: *See*—
Gelo, Mark A.; and Hirshberg, Moshe J., 4,687,500, Cl. 65-36.000.

Hisaoka, Satoshi: *See*—
Matsuzaka, Takashi; Saito, Toshihiko; and Hisaoka, Satoshi, 4,687,435, Cl. 431-1.000.

Hitachi Chemical Co. Ltd.: *See*—
Ishii, Mitsuru; Akiyama, Seikichi; and Ishibashi, Hiroyuki, 4,687,683, Cl. 427-160.000.

Hitachi, Ltd.: *See*—
Achiha, Masahiko, 4,688,084, Cl. 358-36.000.
Fukuhara, Satoru; and Todokoro, Hideo, 4,687,931, Cl. 250-310.000.
Furuhata, Takashi; and Owashi, Hitoaki, 4,688,081, Cl. 358-19.000.
Gotou, Tadashi; and Yamamoto, Hisashi, 4,687,418, Cl. 417-50.000.
Hasegawa, Kunio; Shimizu, Tasuku; Horiuchi, Tetsuo; and Ito, Hisao, 4,687,625, Cl. 376-292.000.
Imaide, Takuya, 4,688,085, Cl. 358-44.000.
Kubo, Kiichirou; and Kanazaki, Mikio, 4,687,300, Cl. 350-336.000.
Miyauchi, Tateoki; Yamaguchi, Hiroshi; Hongo, Mikio; Mizukoshi, Katsuro; Shimase, Akira; and Satoh, Ryohei, 4,687,939, Cl. 250-492.200.
Mutoh, Nobuyoshi; Sakai, Keijiro; Suzuki, Toshio; Ueda, Akiteru; Nandoh, Kenji; and Okajima, Ikuo, 4,688,162, Cl. 363-80.000.
Nakamura, Katsunori; Kurano, Akira; Shiroyanagi, Yoshiro; and Kishiro, Shigeru, 4,688,221, Cl. 371-13.000.
Takano, Yoshiya; Hoshi, Yoshikazu; Abe, Takao; and Tomozaki, Ryozoo, 4,687,425, Cl. 417-462.000.
Takatori, Hiroshi; Suzuki, Toshiro; Matsubara, Osamu; and Yamada, Izuru, 4,687,998, Cl. 328-58.000.
Tamura, Hifumi; Yamamoto, Shigehiko; Shichi, Hiroyasu; and Ishitani, Toru, 4,687,930, Cl. 250-309.000.
Tamura, Hifumi; and Shichi, Hiroyasu, 4,687,938, Cl. 250-423.00F.
Yamaoka, Hiromasa; Okamoto, Tadashi; Iwasa, Yuzaburo; and Kimura, Kouichi, 4,688,193, Cl. 364-900.000.

Hitachi Metals, Ltd.: *See*—
Eino, Muneyoshi, 4,687,608, Cl. 264-62.000.

Hjalmer, William D.; and Carns, Hutchinson W., to Schlegel Corporation. Method and apparatus for making tufted buffing pads of varied density. 4,686,918, Cl. 112-410.000.

Hjortsberg, Arne; Holmstrom, Goran; and Osterlund, Erik, to ASEA Aktiebolag. Current transmission system for HVDC including a solid insulator having a surface coating of resin containing chromium oxide or iron oxide. 4,688,142, Cl. 361-332.000.

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Babendererde, Siegmund; Hillemeier, Bernd; and Braach, Otto, 4,687,374, Cl. 405-146.000.

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Hensel, Hartmut; and Dallmann, Hermann, 4,687,699, Cl. 428-213.000.
Hensel, Hartmut; and Dallmann, Hermann, 4,687,700, Cl. 428-213.000.
Rewitzer, Siegfried, 4,687,462, Cl. 493-100.000.
Schlogl, Gunter; Mack, Gerhard; and Michel, Manfred, 4,687,726, Cl. 430-175.000.
Schrodter, Hermann; Braun, Albert; and Kampmann, Friedrich-Wilhelm, 4,687,512, Cl. 75-58.000.

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Biniasz, Franz-Josef; Engl, Bernhard; Fuchs, Axel; and Huser, Margit, 4,687,525, Cl. 148-336.000.

Hoffman, Dorothy M.; Tams, Frederick J., III; and McGinn, Joseph T., to RCA Corporation. Epitaxial metal silicide layers. 4,687,537, Cl. 156-612.000.

Hoffman, Roger T., to National Air Sander, Inc. Straight-line rubbing machine with thrust transmitting members. 4,686,797, Cl. 51-170.0TL.

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Frater, Georg; Suchy, Milos; Wenger, Jean; and Winternitz, Paul, 4,687,849, Cl. 544-354.000.
Pauling, Horst; and Wehrli, Christof, 4,687,859, Cl. 548-321.000.

Holl, Norbert: *See*—
Gruehn, Dietrich; Fehrenbach, Hubert; and Holl, Norbert, 4,688,129, Cl. 360-133.000.

Holland, Brian J.; and Kotilinek, Mark P., to Storm Products Co. High frequency coaxial connector adaptor. 4,687,279, Cl. 439-578.000.

Holland, John M., to Chevron Research Company. Fiber optic receiver having a combined baseline clamp and automatic gain control detector. 4,688,268, Cl. 455-619.000.

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Kriegner, Othmar; Lang, Franz; Holleis, Gunter; Schwaha, Karl; and Granitz, Fritz, 4,687,141, Cl. 239-520.000.

Hollowood, John; Jackson, Arthur; and Heyes, Graham, to Fine Organics Limited. Preparation of thiazine derivatives. 4,687,845, Cl. 544-54.000.

Holm, Albert E.; and Holm, Grant A. Method and apparatus for detecting leaks. 4,686,851, Cl. 73-49.200.

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Holmes, Richard E.; Mays, Joe A.; and Tyler, Michael C., to Electronic Image Systems, Inc. Digital waveform generator. 4,687,973, Cl. 315-371.000.

Holmes, Robert T.: *See*—
Graiff, Leonard B.; and Holmes, Robert T., 4,687,034, Cl. 141-69.000.

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Van Herrtum, John C.; and Holmsen, Theodore W., 4,687,509, Cl. 71-121.000.

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Hjortsberg, Arne; Holmstrom, Goran; and Osterlund, Erik, 4,688,142, Cl. 361-332.000.

Holub, Fred F.: *See*—
Quinn, Clayton B.; and Holub, Fred F., 4,687,819, Cl. 525-425.000.

Holz, Michael; and Dorschner, Terry A., to Raytheon Company. Ring laser gyroscope. 4,687,331, Cl. 356-350.000.

Homick, Richard: *See*—
Lim, Drahoslav; Jacoby, Stephen; Homick, Richard; and Powers, Frank, 4,687,485, Cl. 623-6.000.

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Anno, Nobuo; and Arai, Takeo, 4,686,943, Cl. 123-41.740.
Aoki, Takashi; Sato, Yoichi; and Fukuda, Yukihiro, 4,686,872, Cl. 74-869.000.
Inagaki, Takashi; and Nakano, Shinichi, 4,686,945, Cl. 123-90.220.
Inomata, Fumio; and Iwadate, Tooru, 4,687,069, Cl. 180-68.200.
Kawamoto, Yoshimich; Furukawa, Yoshimi; Hamada, Tetsuro; and Serizawa, Mitsuya, 4,687,216, Cl. 280-91.000.
Komuro, Katsusuke, 4,687,072, Cl. 180-219.000.
Sasao, Isamu; and Takaoka, Yoshiyasu, 4,687,142, Cl. 239-533.300.
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Honda, Kazuyoshi: *See—*
Sugita, Ryuji; Honda, Kazuyoshi; Nishida, Hiroshi; and Noda, Kyoji, 4,687,712, Cl. 428-611.000.

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Hongo, Mikio: *See—*
Miyauchi, Tateoki; Yamaguchi, Hiroshi; Hongo, Mikio; Mizukoshi, Katsuro; Shimase, Akira; and Satoh, Ryohei, 4,687,939, Cl. 250-492.200.

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van Langen, Jean M., 4,687,183, Cl. 266-156.000.

Horber, Ralph W., to Seiberco Incorporated. Polyphase DC motor with sensor poles. 4,687,961, Cl. 310-186.000.

Horiuchi, Tetsuo: *See—*
Hasegawa, Kunio; Shimizu, Tasuku; Horiuchi, Tetsuo; and Ito, Hisao, 4,687,625, Cl. 376-292.000.

Horn, Hans C.: *See—*
Grimmer, Johannes; and Horn, Hans C., 4,687,847, Cl. 544-251.000.

Horrmann, Wilhelm. Fatty aldehydes and acids in the treatment of neurological and dermatological diseases. 4,687,783, Cl. 514-693.000.

Hosaka, Sumio, to Pioneer Electronic Corporation. Information recording and regenerating system. 4,688,107, Cl. 358-342.000.

Hosemann, Rolf; Mayland, Walter; and Walter, Juergen, to Erno Raumfahrttechnik GmbH. Non-destructive testing of fiber reinforced structural materials. 4,688,240, Cl. 378-70.000.

Hoshi, Yoshikazu: *See—*
Takano, Yoshiya; Hoshi, Yoshikazu; Abe, Takao; and Tomozaki, Ryozoo, 4,687,425, Cl. 417-462.000.

Hosiden Electronics, Ltd.: *See—*
Aoki, Shigeo; Ugai, Yasuhiro; Miyake, Katsumi; and Okamoto, Kotaro, 4,687,298, Cl. 350-334.000.

Hostetler, Michael S.: *See—*
Gudaitis, Donald A.; McCaskey, John P.; and Hostetler, Michael S., 4,688,168, Cl. 364-200.000.

Hou, Kenneth C.; and Liao, Tung-Ping D., to Cuno Incorporated. Modified polypeptide supports. 4,687,820, Cl. 525-54.100.

Houck, Willie G., Jr.; Sprinkel, Francis M., Jr.; Newsome, Reginald W.; Spruill, David B.; and Nichols, Walter A., to Philip Morris Incorporated. Filter cigarette. 4,687,008, Cl. 131-335.000.

Hounsfield, Godfrey N.: *See—*
Ashton, Mark; and Hounsfield, Godfrey N., 4,687,979, Cl. 318-638.000.

House Food Industries Co., Ltd.: *See—*
Sugisawa, Ko; Yamamoto, Masanori; Yasuda, Ataushi; Nomura, Yukihiro; and Amano, Toshio, 4,687,739, Cl. 435-69.000.

Houston, David L.: *See—*
Carroll, Charles B.; and Houston, David L., 4,687,966, Cl. 313-440.000.

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Hoving, Klaas: *See—*
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Howard, Michael C.: *See—*
Moore, Ronald D.; Kavanaugh, James D.; Phelps, Richard A.; and Howard, Michael C., 4,686,741, Cl. 16-112.000.

Howell, Edward K., to General Electric Company. Thyristor commutation circuit. 4,687,950, Cl. 307-642.000.

Howell, Thomas H.: *See—*
Ferrell, Charles W.; and Howell, Thomas H., 4,688,186, Cl. 364-764.000.

Howes, Roger J.; and Othen, David G., to British Petroleum Company, p.l.c., The. Process for producing corrosion inhibiting particles. 4,687,595, Cl. 252-387.000.

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Rizk, Sidky D.; and Hsieh, Harry W. S., 4,687,533, Cl. 156-307.300.

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Oswald, Alexis A.; Jermasen, Torris G.; Westner, Andrew A.; and Huang, I-Der, 4,687,866, Cl. 556-18.000.
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Huang, Mycoh. Assembled lampshade. 4,688,155, Cl. 362-352.000.

Hubert, Nicola P., to Halcyon Waterbed Inc. Waterbed. 4,686,721, Cl. 5-451.000.

Hubler, Gerhard: *See—*
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Huffman, William F.: *See—*
Ali, Fadia E.; Huffman, William F.; Marshall, Garland R.; and Moore, Michael L., 4,687,758, Cl. 514-11.000.

Huggins, Raymond W., to Xerox Corporation. Belt speed measurement using an optical fiber reflectometer. 4,687,925, Cl. 250-223.00R.

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Amboss, Kurt, 4,687,417, Cl. 417-49.000.
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Ledebuhr, Arno G., 4,687,301, Cl. 350-401.000.
Musslyn, Eugene F.; and Kelkar, Anand, 4,687,970, Cl. 315-106.000.
O'Brien, Edwin L., 4,688,044, Cl. 342-160.000.
Pastor, Antonio C., 4,687,538, Cl. 156-616.00R.
Ward, J. William; Bartelt, John L.; Seliger, Robert L.; and McKenna, Charles M., 4,687,940, Cl. 250-492.200.
Wong, Mon N.; and Linhardt, Wilbur J., 4,688,006, Cl. 333-113.000.
Wreede, John E.; and Arns, James A., 4,687,720, Cl. 430-2.000.

Hughes, John L.; and Palmer, John, to Hughes Technology PTY LTD. Safe laser pointers with remote directional activation. 4,687,918, Cl. 250-205.000.

Hughes Technology PTY LTD: *See—*
Hughes, John L.; and Palmer, John, 4,687,918, Cl. 250-205.000.

Hughes Tool Company: *See—*
Gilbert, Bruce, 4,687,063, Cl. 166-382.000.

Huinink, Heinrich: *See—*
Pfeiffer, Hans-Dieter; Huinink, Heinrich; and Reese, Thorsten, 4,687,037, Cl. 152-209.00R.

Hull, Diane H. Gas-inflatable, floating, portable seat. 4,687,452, Cl. 441-131.000.

Huls Aktiengelsellschaft: *See—*
Mumcu, Salih, 4,687,837, Cl. 528-496.000.

Huls Aktiengesellschaft: *See—*
Bartmann, Martin; and Seeliger, Wolfgang, 4,687,834, Cl. 528-291.000.
Mumcu, Salih; and Winzer, Helmut, 4,687,838, Cl. 528-496.000.

Humber, Leslie G.: *See—*
Mobilio, Dominick; Demerson, Christopher A.; and Humber, Leslie G., 4,687,860, Cl. 548-439.000.

Hume, Catherine G., executor: *See—*
Hume, Kenneth J., deceased; and Ogborne, Laurence N., 4,686,876, Cl. 83-455.000.

Hume, Kenneth J., deceased (by Hume, Catherine G., executor); and Ogborne, Laurence N., to Rotatrim Limited. Apparatus for cutting sheet material. 4,686,876, Cl. 83-455.000.

Humpert, Jurgen: *See—*
Kahle, Dieter; Humpert, Jurgen; and Pawelzik, Manfred, 4,687,025, Cl. 137-625.170.

Humphreys, Neil V.: *See—*
Sprunt, Eve S.; Humphreys, Neil V.; Muegge, Ernest L.; and Dixon, James R., Jr., 4,688,238, Cl. 378-4.000.

Hung, William M.: *See—*
Schmidt, Paul J.; and Hung, William M., 4,688,059, Cl. 503-220.000.

Hunold, Klaus; Lipp, Alfred; Reinmuth, Klaus; Arnold, Peter; and Napholcz, Johannes, to Elektroschmelzwerk Kempten GmbH. Process for the manufacture of shaped articles from reaction-bonded silicon nitride by nitridation under elevated nitrogen gas pressure. 4,687,655, Cl. 423-344.000.

Hunt, Ronald E., to International Business Machines Corporation. Sheet feed apparatus with fixed separator protrusions. 4,687,192, Cl. 271-119.000.

Hunter Douglas Inc.: *See—*
Anderson, Richard N., 4,687,041, Cl. 160-168.00R.

Hunter, Harry L.: *See—*
Gamble, Donald E.; Hunter, Harry L.; and McKinney, Gordon R., 4,687,771, Cl. 514-253.000.

Hurd, Frank W., deceased; by Hurd, Susan M., executor; and by Hurd, Harland C., executor. Metal or alloy forming reduction process and apparatus. 4,687,632, Cl. 419-45.000.

Hurd, Harland C., executor: *See—*
Hurd, Frank W., deceased; Hurd, Susan M., executor; and Hurd, Harland C., executor, 4,687,632, Cl. 419-45.000.

Hurd, Susan M., executor: *See—*
Hurd, Frank W., deceased; Hurd, Susan M., executor; and Hurd, Harland C., executor, 4,687,632, Cl. 419-45.000.

Hurner, Erwin E. Engine idle advance. 4,686,950, Cl. 123-339.000.

Husain, Matloob; and Lai, Ban-Yen, to Chicago Bridge & Iron Company. Concentration method. 4,687,671, Cl. 426-384.000.

Husemann, Karl-Dieter: *See—*
Goslowsky, Hans; Lewerenz, Hans-Joachim; Fiechter, Manuel S.; and Husemann, Karl-Dieter, 4,687,881, Cl. 136-255.000.

Huser, Margit: *See—*
Biniasz, Franz-Josef; Engl, Bernhard; Fuchs, Axel; and Huser, Margit, 4,687,525, Cl. 148-336.000.

Huston, Ernest L.: *See—*
Goodell, Paul D.; Huston, Ernest L.; Rudman, Peter S.; and Sandrock, Gary D., 4,687,650, Cl. 423-248.000.

Hutchin, Richard A., to Itek Corporation. Method of imaging a target illuminated through an optically distorting region. 4,688,086, Cl. 358-95.000.

Hyde, Roger J., to Alumasc Limited. Liquid dispensing tap. 4,687,123, Cl. 222-518.000.

I-Flow Corporation: *See—*
Tai, Henry T.; and Brown, Eric W., 4,687,475, Cl. 604-248.000.

Ibi, Akira; Sato, Takushi; Yamaguchi, Akihiro; Takahashi, Shigeru; Shishido, Shigeyuki; Tamai, Shoji; and Nakajima, Hisai, to Mitsui Toatsu Chemicals, Inc. Polyimide adhesives, coats and prepreg. 4,687,836, Cl. 528-353.000.

Ichida, Toshio: *See—*
Ogata, Hajime; Nakakouji, Hisatada; Akeda, Yasuhiro; Ichida, Toshio; Irie, Toshio; and Otsuka, Sachiko, 4,687,713, Cl. 428-628.000.

Ichimiya, Touru: *See—*
Naruoka, Takao; Moriya, Yoshihito; and Ichimiya, Touru, 4,687,348, Cl. 384-255.000.

ICI Americas Inc.: *See—*
Hartmann, Ludwig A.; and Stephen, John F., 4,687,854, Cl. 546-261.000.
Nelson, Richard V.; and Stephen, John F., 4,687,800, Cl. 524-103.000.

Ida, Masao: *See—*
Inoue, Masaru; Ida, Masao; and Kohara, Takao, 4,686,863, Cl. 74-425.000.

Ide, Yukio: *See—*
Ohshima, Kohichi; Kageyama, Yoshiyuki; Ide, Yukio; Fujimura, Itaru; and Kunita, Masako, 4,687,723, Cl. 430-65.000.

Ideal Instruments, Inc.: *See—*
Prindle, Gordon E.; and Kelm, Thomas J., 4,687,465, Cl. 604-61.000.

Identification Systems Company L.P.: *See—*
Wilfert, Ronald A., 4,687,526, Cl. 156-64.000.

Ielmini, Angelo, to Patterson Frozen Foods, Inc. Microwave carton. 4,687,104, Cl. 206-607.000.

Igaki, Tetsuo: *See—*
Obitsu, Takeo; Igaki, Tetsuo; Kinoshita, Kimiaki; Nanbu, Morio; and Satoh, Shinichi, 4,687,862, Cl. 549-224.000.

Igawa, Kazushige: *See—*
Arika, Junji; Igawa, Kazushige; and Itabashi, Keiji, 4,687,653, Cl. 423-329.000.

Igi, Hisashi; Ohta, Eiichi; Bandai, Yasuhito; and Takagi, Kazuhiko, to Brother Kogyo Kabushiki Kaisha. Printer with an image reader. 4,687,352, Cl. 400-73.000.

Iinuma, Yoshio, to Citizen Watch Co., Ltd. Connecting structure for a display device. 4,688,074, Cl. 357-79.000.

Iisaka, Katsuyoshi: *See—*
Mitani, Tetsuo; Baba, Fumiaki; and Iisaka, Katsuyoshi, 4,687,801, Cl. 524-104.000.

Iizuka, Toshimi: *See—*
Kamata, Shigeru; and Iizuka, Toshimi, 4,687,297, Cl. 350-252.000.

Ikeda, Haruhiko; and Hiraishi, Shigetoshi, to Mitsubishi Paper Mills, Ltd. Thermal recording materials. 4,688,058, Cl. 503-209.000.

Ikeda, Takashi: *See—*
Taniguti, Ryosuke; Kohmo, Hidenori; Kubo, Manabu; and Ikeda, Takashi, 4,688,184, Cl. 364-560.000.

Ikehata, Tsutomu; Masuda, Katsuya; Yasunaga, Makoto; and Michioto, Takao, to Citizen Watch Co., Ltd. Printing head for use in dot printers. 4,687,355, Cl. 400-124.000.

Ikemori, Keiji; Tanaka, Tsunefumi; and Kato, Masatake, to Canon Kabushiki Kaisha. Zoom lens. 4,687,302, Cl. 350-427.000.

Ilmoniemi, Erkki; Koskimies, Jouni; Lyytinen, Markku; Pitkajarvi, Kari; and Ottelin, Esa, to Valmet Oy. Method and apparatus for controlling distortion of fibre orientation in a paper web. 4,687,548, Cl. 162-216.000.

Imada, Eiji: *See—*
Ehara, Shaw; Kojima, Yoshimi; Imada, Eiji; Hayakawa, Takashi; and Matsuyama, Toshiro, 4,687,724, Cl. 430-84.000.

Image Technology Incorporated: *See—*
Beg, Mirza R.; Perl, Julius; and Malcolm, Ronald D., Jr., 4,688,095, Cl. 358-160.000.

Imai, Masahiro: *See—*
Aoshima, Terutaka; Asahi, Morio; Imai, Masahiro; and Narita, Ryuuho, 4,687,910, Cl. 219-506.000.

Imai, Nobuhiro: *See—*
Ito, Michio; Shinohara, Yukimasa; and Imai, Nobuhiro, 4,687,283, Cl. 350-6.800.

Imaide, Takuya, to Hitachi, Ltd. Enhanced sensitivity color video camera with reduced red component in second luminance signal. 4,688,085, Cl. 358-44.000.

Imani, Yuichi: *See—*
Matsui, Kazuma; Hattori, Yoshiyuki; Imani, Yuichi; Kuno, Akira; and Nomura, Yoshihisa, 4,687,260, Cl. 303-119.000.

Immuno Aktiengesellschaft fur chemisch-medizinische Produkte: *See—*
Philapitsch, Anton; Wober, Gunter; Eibl, Johann; and Schwarz, Otto, 4,687,664, Cl. 424-85.000.

Imo Delaval Inc.: *See—*
Maddox, James P., 4,687,495, Cl. 55-46.000.

Imperial Chemical Industries plc: *See—*
Ramshaw, Colin, 4,687,585, Cl. 210-787.000.

Imperial Underground Sprinkler Co.: *See—*
Lockwood, James F., 4,687,139, Cl. 239-205.000.

Impexor AG: *See—*
Budmiger, Hermann, 4,686,711, Cl. 2-8.000.

Impink, Albert J., Jr., to Westinghouse Electric Corp. Spectral shift reactor control method. 4,687,620, Cl. 376-209.000.

Inaba, Takahisa: *See—*
Kawai, Chiaki; Ohta, Minoru; and Inaba, Takahisa, 4,686,919, Cl. 114-45.000.

Inaba, Yasuhisa: *See—*
Kazaoka, Kenichi; Okazaki, Hiroshi; and Inaba, Yasuhisa, 4,687,251, Cl. 297-337.000.

Inagaki, Hiroyuki: *See—*
Suzuki, Migaku; Sasaki, Satoshi; Mitsuno, Takashi; and Inagaki, Hiroyuki, 4,687,477, Cl. 604-385.00A.

Inagaki, Takashi; and Nakano, Shinichi, to Honda Giken Kogyo Kabushiki Kaisha. Valve structure for an internal combustion engine. 4,686,945, Cl. 123-90.220.

Inagaki, Yasaburo; and Nakaizumi, Kazuo, to NEC Corporation. Semiconductor dynamic memory device with less power consumption in internal refresh mode. 4,688,196, Cl. 365-222.000.

Inamoto, Tadayoshi; Noguchi, Hiromichi; and Munakata, Megumi, to Canon Kabushiki Kaisha. Liquid jet recording head having a layer of a resin composition curable with an active energy ray. 4,688,052, Cl. 346-140.00R.

Inamoto, Tadayoshi; Noguchi, Hiromichi; and Munakata, Megumi, to Canon Kabushiki Kaisha. Liquid jet recording head. 4,688,054, Cl. 346-140.00R.

Inamoto, Tadayoshi: *See—*
Noguchi, Hiromichi; Inamoto, Tadayoshi; and Munakata, Megumi, 4,688,053, Cl. 346-140.00R.
Noguchi, Hiromichi; Inamoto, Tadayoshi; and Munakata, Megumi, 4,688,055, Cl. 346-140.00R.
Noguchi, Hiromichi; Inamoto, Tadayoshi; and Munakata, Megumi, 4,688,056, Cl. 346-140.00R.

Inazawa, Yoshizumi: *See—*
Takahashi, Toshihiko; Inazawa, Yoshizumi; Tani, Toshiyuki; and Satomura, Shigeyuki, 4,688,115, Cl. 360-70.000.

Inductotherm Corp.: *See—*
Mortimer, John H., 4,688,231, Cl. 373-138.000.

Industrial Innovations, Inc.: *See—*
Urbani, William G., 4,687,584, Cl. 210-769.000.

Ing. C. Olivetti & C., S.p.A.: *See—*
Knirsch, Franco; and Gianolini, Giovanni, 4,687,701, Cl. 428-216.000.

Ingram, Timothy J.: *See—*
Allain, Raymond J.; Bolduc, Henry P., Jr.; Patterson, Thomas R.; and Ingram, Timothy J., 4,686,902, Cl. 101-424.000.

Iniotakis, Nicolaos; and von der Decken, Claus-Benedict, to Kernforschungsanlage Julich GmbH. Process and arrangement for the incremental enrichment of deuterium and/or tritium in a material suitable for the isotope exchange of deuterium and/or tritium with hydrogen. 4,687,644, Cl. 422-159.000.

Inomata, Fumio; and Iwadate, Tooru, to Honda Giken Kogyo Kabushiki Kaisha. Cooling structure for an engine in a straddled type vehicle. 4,687,069, Cl. 180-68.200.

Inoue, Masaru; Ida, Masao; and Kohara, Takao, to Tokico Ltd.; and Jidosha Denki Kogyo Kabushiki Kaisha. Rotary actuator. 4,686,863, Cl. 74-425.000.

Inoue, Nori; Moriai, Yasuharu; Sakatani, Atushi; and Yoshida, Noriyuki, to Tokai Electric Wire Company, Ltd.; and Sumitomo Electric Industries, Ltd. Electrical junction box. 4,688,149, Cl. 361-399.000.

Inoue, Satoru: *See—*
Ozaki, Sei; Futamura, Shoji; Kojima, Masaru; and Inoue, Satoru, 4,687,433, Cl. 425-464.000.

Institut Francais du Petrole: *See—*
Quang, Dang V.; Pradel, Claude; Euzen, Jean P.; and Le Page, Jean-Francois, 4,687,656, Cl. 423-361.000.

Institut Problem Materialovedenia Akademii Nauk Ukrainskoi SSR: *See—*
Nevgod, Vasily A.; Garda, Alexandr P.; and Kadyrov, Valery K., 4,687,135, Cl. 239-81.000.

Institute of Technology Precision Electrical Discharge Works: *See—*
Ozaki, Sei; Futamura, Shoji; Kojima, Masaru; and Inoue, Satoru, 4,687,433, Cl. 425-464.000.

Insul Company, Inc.: *See—*
Labate, Michael D.; and Perri, Joseph A., 4,687,184, Cl. 266-270.000.

Interez, Inc.: *See—*
Morris, William J., deceased; Kemmerer, Richard R.; and Christmas, Byron K., 4,687,806, Cl. 524-765.000.

International Business Machines Corp.: *See—*
Blum, Arnold, 4,688,222, Cl. 371-25.000.
Bohg, Armin; Fischer, Ludwig; Gantz, Bruno; Hartmann, Kurt; and Wolfert, Gerhard, 4,688,012, Cl. 335-276.000.
Burns, Francis C.; Dreyfus, Russell W.; and Susko, John R., 4,687,539, Cl. 156-626.000.
Carini, Richard P.; Donnelly, James A.; Ellis, Joseph J., Jr.; and Lanzoni, Thomas P., 4,688,033, Cl. 340-800.000.
Cottrell, Roger L.; and Murphy, Alan S., 4,688,181, Cl. 364-521.000.
DeGeorge, Peter J.; Ross, Roger F.; and Sims, Donald E., 4,687,353, Cl. 400-76.000.
Eichelberger, Edward B.; Langmaid, Roger N.; Lindbloom, Eric; Motika, Franco; Sinchak, John L.; and Waicukauski, John A., 4,687,988, Cl. 324-73.0AT.
Fok, Wilson W., 4,688,016, Cl. 340-347.0DD.
Gray, James P.; Hansen, Peter J.; Lerner, Michael A.; and Pozefsky, Mark, 4,688,035, Cl. 340-825.520.

Hunt, Ronald E., 4,687,192, Cl. 271-119.000.
Joy, Richard C.; Kemlage, Bernard M.; and Mauer, John L., IV, 4,688,069, Cl. 357-34.000.
Kraus, Charles J.; Stoller, Herbert I.; and Wu, Leon L., 4,688,151, Cl. 361-405.000.
Lu, Nicky C.; Ning, Tak H.; and Terman, Lewis M., 4,688,063, Cl. 357-23.600.
Motika, Franco; and Waicukauski, John A., 4,688,223, Cl. 371-27.000.
Sokol, Gary L.; Steen, Michael J.; and Stephen, Douglas A., 4,688,123, Cl. 360-97.000.
Wright, Charles G., 4,688,172, Cl. 364-200.000.

International Computers Limited: *See*—
Fox, Trevor R., 4,688,232, Cl. 375-87.000.
Washington, Ivan G., 4,688,188, Cl. 364-900.000.

Internationale Octrooi Maatschappij "Octropa" BV: *See*—
Lock, Michael W. B., 4,688,199, Cl. 367-137.000.

Inuzuka, Hideo: *See*—
Emoto, Masami; and Inuzuka, Hideo, 4,687,916, Cl. 250-201.000.

Irie, Toshio: *See*—
Ogata, Hajime; Nakakouji, Hisatada; Akeda, Yasuhiro; Ichida, Toshio; Irie, Toshio; and Otsuka, Sachiko, 4,687,713, Cl. 428-628.000.

Irii, Shinsuke: *See*—
Tanaka, Masato; Irii, Shinsuke; and Shiozaki, Tomoharu, 4,688,060, Cl. 503-214.000.

IRT Corporation: *See*—
Longden, Larry L., 4,687,622, Cl. 376-254.000.

Irwin, Jere F.; Doornink, John R.; and Roberts, Clive J., to Irwin Research & Development, Inc. Apparatus for comminuting waste materials. 4,687,144, Cl. 241-49.000.

Irwin, Lawrence F. Waste line cleanout apparatus. 4,686,732, Cl. 15-104.3SN.

Irwin Research & Development, Inc.: *See*—
Irwin, Jere F.; Doornink, John R.; and Roberts, Clive J., 4,687,144, Cl. 241-49.000.

Isa, Isao: *See*—
Ebisawa, Makoto; Shindo, Shuko; Hashizume, Kenichi; and Isa, Isao, 4,688,153, Cl. 361-433.000.

Isayama, Katsuhiko: *See*—
Kawakubo, Fumio; Takanoo, Miyako; Yukimoto, Sadao; and Isayama, Katsuhiko, 4,687,818, Cl. 525-404.000.

ISC Cardion Electronics, Inc.: *See*—
Schwab, Carl E., 4,688,046, Cl. 342-456.000.

ISE Electronics Corporation: *See*—
Uemura, Sashiro; and Iwade, Motoo, 4,688,030, Cl. 340-781.000.

Ise, Yoji; Kanno, Teruo; and Yamaguchi, Akira, to Myotoku Ltd. Vacuum valve-sensor device. 4,687,021, Cl. 137-526.000.

ISG AG: *See*—
Larsson, Karl O. A. H., 4,687,466, Cl. 604-82.000.

Ishi, Yuuhei; and Nakamura, Hideki, to NEC Corporation. Method of implementing burst acquisition control in TDMA system. 4,688,217, Cl. 370-104.000.

Ishibashi, Hiroyuki: *See*—
Ishii, Mitsuru; Akiyama, Seikichi; and Ishibashi, Hiroyuki, 4,687,683, Cl. 427-160.000.

Ishii, Hiroyuki, to Sugatsune Industrial Co., Ltd. Stopper for door. 4,686,740, Cl. 16-85.000.

Ishii, Mitsuru; Akiyama, Seikichi; and Ishibashi, Hiroyuki, to Hitachi Chemical Co. Ltd. Scintillator for radiation detection and process for producing the same. 4,687,683, Cl. 427-160.000.

Ishikawa, Masao; Koboshi, Shigeharu; and Kuse, Satoru, to Konishiroku Photo Industry Co., Ltd. Method for processing light-sensitive silver halide color photographic material which contains a high speed reactive yellow coupler by processing, after fixings, with a sulfite-containing solution and without substantial washing. 4,687,731, Cl. 430-372.000.

Ishikawa, Noboru: *See*—
Sawaide, Minoru; Ishikawa, Noboru; and Shiokawa, Hideyo, 4,687,517, Cl. 106-96.000.

Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See*—
Koga, Tadao; Sugimori, Mitsuru; Terasaki, Masanori; Maenosono, Tsukasa; Tsushima, Satoru; Yoshida, Kazuo; Kuriwaki, Tetsusho; and Hirado, Miharu, 4,687,894, Cl. 219-10.430.

Ishimaru, Toshiyasu: *See*—
Yamamoto, Yuichi; Yoshida, Takashi; Fukatsu, Shunzo; and Ishimaru, Toshiyasu, 4,687,769, Cl. 514-202.000.

Ishimura, Takiji: *See*—
Iwamoto, Katsuharu; Kawakami, Osamu; Miyagawa, Hideo; Tashiro, Ikuo; and Ishimura, Takiji, 4,687,927, Cl. 250-231.00P.

Ishino Seisakujo Co., Ltd.: *See*—
Ishino, Yuuji; Takai, Hitoshi; and Yoshida, Toshihiro, 4,686,895, Cl. 99-440.000.

Ishino, Yuuji; Takai, Hitoshi; and Yoshida, Toshihiro, to Ishino Seisakujo Co., Ltd. Apparatus for producing boiled eggs. 4,686,895, Cl. 99-440.000.

Ishitani, Toru: *See*—
Tamura, Hifumi; Yamamoto, Shigehiko; Shichi, Hiroyasu; and Ishitani, Toru, 4,687,930, Cl. 250-309.000.

Ishizaka, Shoji: *See*—
Tanimoto, Akikazu; Ishizaka, Shoji; Endo, Yutaka; Suzuki, Hiroyuki; and Yanagihara, Masamitsu, 4,687,322, Cl. 355-55.000.

Ishizaki, Kanjiro: *See*—
Suzuki, Osamu; Ishizaki, Kanjiro; and Ozawa, Seiichi, deceased, 4,687,614, Cl. 264-40.100.

Isobe, Minoru: *See*—
Kikuchi, Hiroshi; Hayashi, Kuniharu; Isobe, Minoru; Tanuma, Jiro; and Maekawa, Masanori, 4,687,361, Cl. 400-322.000.

Isover Saint-Gobain "Les Miroirs": *See*—
Berscheid, Peter; and Friesdorf, Jakob, 4,687,530, Cl. 156-215.000.

Isovolta Oesterreichische Isolierstoffwerke Aktiengesellschaft: *See*—
Melcher, Gerhard, 4,687,685, Cl. 427-366.000.

Itabashi, Keiji: *See*—
Arika, Junji; Igawa, Kazushige; and Itabashi, Keiji, 4,687,653, Cl. 423-329.000.

Itai, Reiichi: *See*—
Hirakata, Kaoru; Mochizuki, Masaaki; Kanai, Hideo; and Itai, Reiichi, 4,687,565, Cl. 204-258.000.

Itek Corporation: *See*—
Hutchin, Richard A., 4,688,086, Cl. 358-95.000.

Ito, Hisao: *See*—
Hasegawa, Kunio; Shimizu, Tasuku; Horiuchi, Tetsuo; and Ito, Hisao, 4,687,625, Cl. 376-292.000.

Ito, Makoto; Mori, Terumi; and Takahashi, Hiroyoshi, to Nippon Gakki Seizo Kabushiki Kaisha. Key touch adjuster for a keyboard musical instrument. 4,686,879, Cl. 84-440.000.

Ito, Michio; Shinohara, Yukimasa; and Imai, Nobuhiro, to Canon Kabushiki Kaisha. Scanning optical system. 4,687,283, Cl. 350-6.800.

Ito, Syoji: *See*—
Shiraishi, Masao; Nishiya, Yoshinori; and Ito, Syoji, 4,687,804, Cl. 524-505.000.

Ito, Yasuro; Higuchi, Yoshiro; Shiki, Takeshi; Tsuji, Yukikazu; Tsuji, Masanori; and Hayakawa, Mitsutaka, to Ito, Yasuro; and Taisei Corporation. Method of preparing mortar or concrete. 4,686,852, Cl. 73-61.00R.

Ito, Yukio: *See*—
Takai, Kazuki; Ito, Yukio; Kinoshita, Shigeo; Kikuchi, Junichi; and Fukazawa, Toshihiko, 4,688,122, Cl. 360-96.500.

Itoh, Akira: *See*—
Emoto, Kazuhiro; Itoh, Akira; and Haino, Kozo, 4,687,721, Cl. 430-58.000.

Itoh, Hiroshi; Suzuki, Yasutoshi; Fukada, Tsuyoshi; Ohmi, Shinya; and Hara, Kunihiko, to Nippondenso Co., Ltd. Liquid crystal element driving apparatus. 4,687,956, Cl. 307-310.000.

Itoh, Masaaki, to Minolta Camera Kabushiki Kaisha. Mark detection apparatus for a micro-roll film. 4,687,321, Cl. 355-41.000.

Itou, Takeo: *See*—
Sagou, Seiji; and Itou, Takeo, 4,687,825, Cl. 427-54.100.

ITT Composants et Instruments: *See*—
Szoboszlai, Istvan; and Roucher, Christian, 4,687,271, Cl. 439-350.000.

Iuliano, William N.: *See*—
Cline, John A.; and Iuliano, William N., 4,687,410, Cl. 415-17.000.

Ivac Corporation: *See*—
Maget, Henri J. R.; and Krejci, Paul, 4,687,423, Cl. 417-379.000.

Iverson, Jacob E. Pressure relief valve and regulator. 4,687,022, Cl. 137-531.000.

Iwadate, Tooru: *See*—
Inomata, Fumio; and Iwadate, Tooru, 4,687,069, Cl. 180-68.200.

Iwade, Motoo: *See*—
Uemura, Sashiro; and Iwade, Motoo, 4,688,030, Cl. 340-781.000.

Iwahori, Hiroshi: *See*—
Hayashi, Masahiko; and Iwahori, Hiroshi, 4,687,522, Cl. 134-8.000.

Iwamoto, Katsuharu; Kawakami, Osamu; Miyagawa, Hideo; Tashiro, Ikuo; and Ishimura, Takiji, to Kabushiki Kaisha Toshiba. Pressure measuring system. 4,687,927, Cl. 250-231.00P.

Iwasa, Yuzaburo: *See*—
Yamaoka, Hiromasa; Okamoto, Tadashi; Iwasa, Yuzaburo; and Kimura, Kouichi, 4,688,193, Cl. 364-900.000.

Iwasaki Sangyo Kabushiki Kaisha: *See*—
Iwasaki, Shoichi, 4,687,095, Cl. 206-234.000.

Iwasaki, Shoichi, to Iwasaki Sangyo Kabushiki Kaisha. Box provided with a lint remover and dust brush. 4,687,095, Cl. 206-234.000.

Iwasaki, Yasumasa: *See*—
Shibasaki, Sohei; Iwasaki, Yasumasa; and Ono, Noriki, 4,687,318, Cl. 355-5.000.

Izui, Yoshio: *See*—
Umeda, Tatsutoshi; Tani, Yoshio; Kaai, Takeshi; Nakano, Keiichi; and Izui, Yoshio, 4,686,946, Cl. 123-90.410.

Izumiya, Hirotsugu: *See*—
Kajihara, Takehiro; Atsumi, Senji; and Izumiya, Hirotsugu, 4,687,969, Cl. 313-625.000.

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Rhodes, John; and Evans, Brian K., 4,687,667, Cl. 424-195.100.

J. M. Voith GmbH: *See*—
Kotitschke, Gerhard; and Benz, Wilheim, 4,686,778, Cl. 34-117.000.

Jabs, Gert: *See*—
Runzheimer, Hans-volker; Nehen, Ulrich; and Jabs, Gert, 4,687,853, Cl. 546-121.000.

Jackson, Arthur: *See*—
Hollowood, John; Jackson, Arthur; and Heyes, Graham, 4,687,845, Cl. 544-54.000.

Jackson, Bruce J.: *See*—
Knowles, Vernon L.; Wilcox, Roger V.; and Jackson, Bruce J., 4,688,118, Cl. 360-75.000.

Jackson, Michael: *See*—
Naimon, Errol J.; and Jackson, Michael, 4,686,975, Cl. 128-204.230.

Jacobs, Charles P.: *See*—
Son, Pyong-Nae; and Jacobs, Charles P., 4,687,850, Cl. 544-384.000.

Jacobs, Paul L.: *See*—
Dunaway, J. C.; and Jacobs, Paul L., 4,686,824, Cl. 60-231.000.

Jacoby, Stephen: *See*—
Lim, Drahoslav; Jacoby, Stephen; Homick, Richard; and Powers, Frank, 4,687,485, Cl. 623-6.000.
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Simonelli, James K.; Scheffel, Gary W.; and Jagielo, Joseph J., 4,687,181, Cl. 251-223.000.
Jancsovics, Istvan. Method for leakproofing building walls, as well as insertion element for implementing the method. 4,686,810, Cl. 52-743.000.
Janos, Alan C.; Jardin, Stephen C.; and Yamada, Masaaki, to United States of America, Energy. Steady-state inductive spheromak operation. 4,687,617, Cl. 376-137.000.
Japan Carlit Co., Ltd., The: *See*—
Ebisawa, Makoto; Shindo, Shuko; Hashizume, Kenichi; and Isa, Isao, 4,688,153, Cl. 361-433.000.
Hirakata, Kaoru; Mochizuki, Masaaki; Kanai, Hideo; and Itai, Reiichi, 4,687,565, Cl. 204-258.000.
Jardin, Stephen C.: *See*—
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Jaritz, Erich; and Krammer, Gunter, to Vereinigte Edelstahlwerke Aktiengesellschaft (VEW). Liquid jet cutting machine for cutting workpieces, especially flat workpieces. 4,686,877, Cl. 83-177.000.
Jarl Extrusions, Inc.: *See*—
Forslin, Gary L., 4,686,805, Cl. 52-208.000.
Jarowenko, Wadym: *See*—
Trzasko, Peter T.; Tessler, Martin M.; Trksak, Ralph; and Jarowenko, Wadym, 4,687,519, Cl. 106-211.000.
Jarrett, Robert D.; and McCain, G. Howard, to BioSpecific Technologies, Inc. Activation of biocompatible polymers with biologicals whose binding complements are pathological effectors. 4,687,808, Cl. 525-54.100.
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Newman, Goeffrey R.; Jasani, Bharat; and Williams, Edward D., 4,687,736, Cl. 435-7.000.
Jeffrey, David C.: *See*—
Hawkes, Graham S.; and Jeffrey, David C., 4,686,927, Cl. 114-312.000.
Jegousse, Michel; and Le Hir, Yves, to Compagnie Francaise des Petroles. Temporarily terminating laying of underwater pipe line. 4,687,378, Cl. 405-171.000.
Jekat, Herbert; Schutz, Erwin; and Stork, Kurt, to SKW Trostberg Aktiengesellschaft. Process for the separation of materials obtained by means of high pressure extraction. 4,687,547, Cl. 159-3.000.
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Brolin, Charles A.; Jennerjohn, Dennis A.; and Moeller, Richard E., 4,687,892, Cl. 219-8.500.
Jensen, Mogens P. Method for enclosing a body in a relatively thick enclosure of elastic material. 4,686,755, Cl. 29-450.000.
Jensen, William L., Jr. Azimuth orientation device. 4,686,929, Cl. 116-318.000.
Jensen, William S.: *See*—
Pardo, Jacob; and Jensen, William S., 4,687,127, Cl. 277-12.000.
Jermasen, Torris G.: *See*—
Oswald, Alexis A.; Jermasen, Torris G.; Westner, Andrew A.; and Huang, I-Der, 4,687,866, Cl. 556-18.000.
Oswald, Alexis A.; Jermasen, Torris G.; Westner, Andrew A.; and Huang, I-Der, 4,687,874, Cl. 568-454.000.
Jerrold Electronics Corp.: *See*—
Lin, Wen T., 4,688,097, Cl. 380-15.000.
Jervis B. Webb Company: *See*—
Pachuta, Martin, 4,687,349, Cl. 384-477.000.
Jesse, Jerry F.: *See*—
Curie, Kevin J.; and Jesse, Jerry F., 4,687,688, Cl. 428-35.000.
Jeumont-Schneider Corporation: *See*—
Paeye, Gerard; and Guiader, Alain, 4,686,836, Cl. 62-235.100.
Jidosha Denki Kogyo Kabushiki Kaisha: *See*—
Inoue, Masaru; Ida, Masao; and Kohara, Takao, 4,686,863, Cl. 74-425.000.
Jinkins, Danny R. Cover assembly for an air moving device. 4,686,893, Cl. 98-119.000.
Jitsugiri, Yukio: *See*—
Matsuo, Masashi; Yamagishi, Nobuyuki; Noshiro, Makoto; Jitsugiri, Yukio; and Ohnishi, Keiichi, 4,687,707, Cl. 428-336.000.
Joelson, C. R. Method of producing a self aligning pipe with configured joint. 4,686,756, Cl. 29-463.000.
Johannes Heidenhain GmbH: *See*—
Schmitt, Walter, 4,688,019, Cl. 340-347.00P.
Johannsmeier, Karl-Heinz: *See*—
Phillips, Edward H.; and Johannsmeier, Karl-Heinz, 4,687,980, Cl. 318-640.000.
Johansson, Borje: *See*—
Santen, Sven; and Johansson, Borje, 4,687,513, Cl. 75-88.000.
John, Clarence D., Jr.: *See*—
Cellier, Francis; Graulty, Robert T.; Johnson, Wendell L.; Batson, David M.; Limpert, John C.; Wu, Christopher K. C.; Bucher, George D.; John, Clarence D., Jr.; Steinkirchner, John E.; Larouere, Paula J.; Shah, Hemant H.; and Williams, Robert A., 4,687,605, Cl. 264-0.500.
Johns Hopkins University, The: *See*—
Krill, Jerry A., 4,688,007, Cl. 333-137.000.
Johnson, Curtis F.; and Gilbert, Douglas J., to San Diego Levco Corporation. Connector for component mounted on circuit board. 4,687,265, Cl. 439-68.000.
Johnson, Donald L.: *See*—
Warren, Wayne F.; Nussbaum, Theodore W.; Cox, Percy T.; and Johnson, Donald L., 4,687,995, Cl. 324-341.000.
Johnson, Edward N.; and Puncoch, Miloslav, to Boeing Company, The. Apparatus for supporting an aircraft guide track for a movable airfoil. 4,687,162, Cl. 244-213.000.
Johnson, James R. Slit sealing method and apparatus. 4,687,532, Cl. 156-251.000.
Johnson, Karen Y.: *See*—
Benedict, James J.; and Johnson, Karen Y., 4,687,768, Cl. 514-102.000.
Johnson Matthey PLC: *See*—
Barnard, Christopher F. J., 4,687,780, Cl. 514-492.000.
Johnson, Randolph W.: *See*—
Banzi, Frederick J., Jr.; Dugan, Michael J.; Johnson, Randolph W.; Saylor, Douglas D.; and Sharper, Craig A., 4,688,209, Cl. 370-15.000.
Johnson, Raynor A.; and Wegener, Jack, to American Industrial Research, Inc. Semi-rigid air pallet type patient mover. 4,686,719, Cl. 5-81.00R.
Johnson, Reaves, to RJM, Inc. Green peanut harvester. 4,687,064, Cl. 171-27.000.
Johnson, Robert E.: *See*—
Clark, Terence J.; and Johnson, Robert E., 4,687,657, Cl. 423-412.000.
Johnson, Stephen R.: *See*—
Bland, Gerald F.; and Johnson, Stephen R., 4,687,450, Cl. 440-89.000.
Johnson, Walter A.: *See*—
Paliwal, Muktesh; and Johnson, Walter A., 4,687,511, Cl. 75-0.50B.
Johnson, Wendell L.: *See*—
Cellier, Francis; Graulty, Robert T.; Johnson, Wendell L.; Batson, David M.; Limpert, John C.; Wu, Christopher K. C.; Bucher, George D.; John, Clarence D., Jr.; Steinkirchner, John E.; Larouere, Paula J.; Shah, Hemant H.; and Williams, Robert A., 4,687,605, Cl. 264-0.500.
Jonasson, Vollmar, to V-J System AB. Method and a device for lining pipelines by means of a flexible hose containing a curable plastic. 4,687,677, Cl. 427-8.000.
Jones, Donald J., to Westinghouse Electric Corp. System and method for operating a steam turbine with digital computer control and with improved monitoring. 4,687,946, Cl. 290-40.00R.
Jorna, Fransesco M.: *See*—
Schaaf, David E.; and Jorna, Fransesco M., 4,686,914, Cl. 111-73.000.
Joshi, Bhagirath S. Computer software security system. 4,688,169, Cl. 364-200.000.
Joubert, Philippe: *See*—
Bachelard, Roland; and Joubert, Philippe, 4,687,601, Cl. 252-638.000.
Joy, Richard C.; Kemlage, Bernard M.; and Mauer, John L., IV, to International Business Machines Corporation. Isolation for high density integrated circuits. 4,688,069, Cl. 357-34.000.
Joyal Products, Inc.: *See*—
Riordan, Edward D.; and Warner, Allan, 4,687,898, Cl. 219-56.220.
Warner, Samuel, 4,687,900, Cl. 219-111.000.
Juillet, Hubert. Dispenser for hot and cold products. 4,687,119, Cl. 221-101.000.
Julius Blum Gesellschaft m.b.H.: *See*—
Rock, Erich; and Rupprechter, Helmut, 4,686,769, Cl. 33-197.000.
Junk, Brian S.: *See*—
Haley, Paul F.; Junk, Brian S.; Renaud, Merle A.; and Rentmeester, Paul C., 4,686,834, Cl. 62-209.000.
Jurinak, Jeff J.: *See*—
Casad, Burton M.; Soni, Yogendra; and Jurinak, Jeff J., 4,687,058, Cl. 166-263.000.
Justice, David D.; and Woodard, Kenneth E., Jr., to Olin Corporation. High current density cell. 4,687,558, Cl. 204-59.00R.
Kaai, Takeshi: *See*—
Umeda, Tatsutoshi; Tani, Yoshio; Kaai, Takeshi; Nakano, Keiichi; and Izui, Yoshio, 4,686,946, Cl. 123-90.410.
Kabushiki Kaisha Advance Kaihatsu Kenkyujo: *See*—
Kawai, Yasuo; and Yazawa, Kazunaga, 4,687,764, Cl. 514-54.000.
Kabushiki Kaisha Kobe Seiki Sho: *See*—
Lemper, Herbert, 4,687,046, Cl. 164-442.000.
Kabushiki Kaisha Kobe Seiko Sho: *See*—
Miyafuji, Motohisa; Yuchi, Tateo; and Tsuno, Riichi, 4,687,633, Cl. 420-481.000.
Kabushiki Kaisha Komatsu Seisakusho: *See*—
Nagatomo, Masatsugu, 4,686,782, Cl. 37-103.000.
Kabushiki Kaisha Sato: *See*—
Ohta, Masataka, 4,687,912, Cl. 235-463.000.
Kabushiki Kaisha Tokai: *See*—
Suzuki, Akira; Mizuta, Yukio; Sato, Rejiro; and Shimizu, Kunio, 4,688,156, Cl. 362-354.000.
Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho: *See*—
Mori, Shinji, 4,687,156, Cl. 242-107.40A.
Kabushiki Kaisha Tokyo Horaisha: *See*—
Higashiguchi, Shigehiko, 4,687,527, Cl. 156-72.000.
Kabushiki Kaisha Toshiba: *See*—
Abiko, Takashi, 4,688,205, Cl. 369-59.000.
Aoshima, Terutaka; Asahi, Morio; Imai, Masahiro; and Narita, Ryuuho, 4,687,910, Cl. 219-506.000.
Ema, Takehiro, 4,688,242, Cl. 378-154.000.
Hirai, Kenji; and Kimura, Yoshinori, 4,688,004, Cl. 331-49.000.

Iwamoto, Katsuharu; Kawakami, Osamu; Miyagawa, Hideo; Tashiro, Ikuo; and Ishimura, Takiji, 4,687,927, Cl. 250-231.00P.
Kaneko, Makoto; Ogura, Ichiro; Asahina, Hiroshi; and Yasuhara, Hiroshi, 4,688,175, Cl. 364-414.000.
Kohyama, Mitsuaki, 4,686,934, Cl. 118-651.000.
Koinuma, Hiroyuki, 4,687,955, Cl. 307-290.000.
Kon, Takao; Yano, Kensaku; Kakegawa, Masayuki; and Shibata, Hidenori, 4,688,098, Cl. 358-213.190.
Matsuzaka, Takashi; Saito, Toshihiko; and Hisaoka, Satoshi, 4,687,435, Cl. 431-1.000.
Ogura, Mitsugi; and Masuoka, Fujio, 4,688,064, Cl. 357-23.600.
Sagou, Seiji; and Itou, Takeo, 4,687,825, Cl. 427-54.100.
Saitou, Masao, 4,687,358, Cl. 400-208.000.
Shiotari, Yoshihisa; and Nagao, Kenichi, 4,688,070, Cl. 357-40.000.
Tanabe, Toshiyuki; and Noguchi, Minoru, 4,688,094, Cl. 358-148.000.
Urata, Masami, 4,688,137, Cl. 361-141.000.
Yasuda, Hiroshi, 4,687,949, Cl. 307-246.000.
Yasuda, Hiroshi; Ochii, Kiyofumi; and Masuoka, Fujio, 4,687,954, Cl. 307-279.000.

Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See*—
Suzuki, Shigeru; Ohta, Masaki; and Takenaka, Kenji, 4,687,419, Cl. 417-222.000.

Kabushiki Kaisha Toyota Chuo Kenkyusho: *See*—
Kato, Takayuki, 4,686,857, Cl. 73-304.00R.

Kabushiki Kaisha Tsukasa Sokken: *See*—
Aramaki, Yuichiro, 4,686,846, Cl. 73-23.000.

Kabushiki Kaisha Universal: *See*—
Okada, Kazuo, 4,687,981, Cl. 318-696.000.

Kabushiki Kaisha Yakult Honsha: *See*—
Tsuru, Daisuke; Yoshimoto, Tadashi; Hagiwara, Hisao; and Kado, Kunio, 4,687,778, Cl. 514-419.000.

Kado, Kunio: *See*—
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Kadyrov, Valery K.: *See*—
Nevgod, Vasily A.; Garda, Alexandr P.; and Kadyrov, Valery K., 4,687,135, Cl. 239-81.000.

Kaehler, Kristine M.; Krahe, Ronald P.; Miraldi, Peter T.; and McBride, Richard A., to American Sterilizer Company. Porous load vapor sterilization cycle. 4,687,635, Cl. 422-26.000.

Kaesler, Ralph W.: *See*—
Wetegrove, Robert L.; and Kaesler, Ralph W., 4,687,807, Cl. 524-827.000.

Kageorge, Pedro W., to B. F. Goodrich Company, The. Pneumatic deicers with inextensible threads. 4,687,159, Cl. 244-134.00A.

Kageyama, Hidehei, to Kotobuki & Co., Ltd. Mechanical pencil and method for assembling the same. 4,687,363, Cl. 401-65.000.

Kageyama, Yoshiyuki: *See*—
Ohshima, Kohichi; Kageyama, Yoshiyuki; Ide, Yukio; Fujimura, Itaru; and Kunita, Masako, 4,687,723, Cl. 430-65.000.

Kagitani, Yoshio: *See*—
Fukushima, Tsunekazu; Emoto, Hiroshi; Kagitani, Yoshio; Yokoyama, Kazumasa; Nishida, Masayuki; and Suyama, Tadakazu, 4,687,762, Cl. 514-34.000.

Kahle, Dieter; Humpert, Jurgen; and Pawelzik, Manfred, to Friedrich Grohe Armaturenfabrik GmbH & Co. Single-control mixing valve. 4,687,025, Cl. 137-625.170.

Kahn, Leonard R. Compatible AM broadcast/data transmisison system. 4,688,255, Cl. 381-16.000.

Kaivanto, Pekka J. Attachment device. 4,686,748, Cl. 24-522.000.

Kajihara, Takehiro; Atsumi, Senji; and Izumiya, Hirotsugu, to ngk Insulators, Ltd. Discharge tube for a high pressure metal vapor discharge lamp and a method of manufacturing the same. 4,687,969, Cl. 313-625.000.

Kajima, Takashi: *See*—
Nagata, Osamu; Kajima, Takashi; and Ozaki, Toshiharu, 4,688,138, Cl. 361-154.000.
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Kakegawa, Masayuki: *See*—
Kon, Takao; Yano, Kensaku; Kakegawa, Masayuki; and Shibata, Hidenori, 4,688,098, Cl. 358-213.190.

Kakuta, Takeshi: *See*—
Miyatsuka, Hajime; Kasuga, Akira; Matsufuji, Akihiro; and Kakuta, Takeshi, 4,687,705, Cl. 428-329.000.

Kallmes, Otto J., to M/K Systems, Inc. Hydrofoil blade. 4,687,549, Cl. 162-352.000.

Kalnajs, Janis I.: *See*—
Kuper, Nina M.; and Kalnajs, Janis I., 4,687,694, Cl. 428-156.000.

Kamal, Nabil: *See*—
Melanson, Lionel J.; and Kamal, Nabil, 4,687,904, Cl. 219-271.000.

Kamas Industri AB: *See*—
Edholm, Thomas; and Stahl, Ulf, 4,687,105, Cl. 209-546.000.

Kamata, Shigeru; and Iizuka, Toshimi, to Canon Kabushiki Kaisha. Lens mounting mechanism. 4,687,297, Cl. 350-252.000.

Kambe, Mitsuru; and Sasaki, Shuichi, to Doryokuro Kakunenryo Kaihatsu Jigyodan. Liquid metal cooled fast breeder reactor. 4,687,624, Cl. 376-264.000.

Kamel, Ahmed A.; Graul, Donald W.; Chan, Fred N. T.; and Gamble, Donald W., to Ford Aerospace & Communications Corporation. Spacecraft camera image registration. 4,688,091, Cl. 358-109.000.

Kamel, Ahmed A.; Graul, Donald W.; Savides, John; and Hanson, Charles W., to Ford Aerospace & Communications Corporation. Satellite camera image navigation. 4,688,092, Cl. 358-109.000.

Kamikaseda, Takeshi; and Yamamoto, Makoto, to National Starch and Chemical Corporation. Room temperature setting adhesive composition. 4,687,809, Cl. 525-57.000.

Kaminski, Donald J.; Frank, Ernest A.; and Grinsteiner, Craig S. Refuse derived fuel delivery system and distribution conveyors. 4,686,913, Cl. 110-110.000.

Kamm, Eugen: *See*—
Schoettle, Klaus; Buhk, Artur; Kamm, Eugen; Berger, Heinz; and Gaiser, Dieter, 4,687,157, Cl. 242-199.000.

Kampmann, Friedrich-Wilhelm: *See*—
Schrodter, Hermann; Braun, Albert; and Kampmann, Friedrich-Wilhelm, 4,687,512, Cl. 75-58.000.

Kanai, Hideo: *See*—
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Kanazaki, Mikio: *See*—
Kubo, Kiichirou; and Kanazaki, Mikio, 4,687,300, Cl. 350-336.000.

Kanda, Osamu: *See*—
Kuroda, Hiroshi; Nishimura, Tsukasa; Nishimura, Masakatsu; Hashimoto, Taiki; Kanda, Osamu; Nozawa, Shigeru; and Shibata, Kenji, 4,687,649, Cl. 423-242.000.

Kanegafuchi Kogaku Kabushiki Kaisha: *See*—
Kawakubo, Fumio; Takanoo, Miyako; Yukimoto, Sadao; and Isayama, Katsuhiko, 4,687,818, Cl. 525-404.000.

Kanegafuchi Kogaku Kogyo Kabushiki Kaisha: *See*—
Maeda, Hirofumi; Nakamura, Kyoichi; and Fukui, Hisatoshi, 4,687,641, Cl. 422-133.000.

Kaneko, Makoto; Ogura, Ichiro; Asahina, Hiroshi; and Yasuhara, Hiroshi, to Kabushiki Kaisha Toshiba. Image processor with automatic setting of window width and level for individual blocks of the image. 4,688,175, Cl. 364-414.000.

Kaneko, Yoji: *See*—
Haganuma, Tomoyuki; and Kaneko, Yoji, 4,688,100, Cl. 358-261.000.

Kanetsuna, Nobumitsu: *See*—
Kawasaki, Hiroaki; and Kanetsuna, Nobumitsu, 4,688,029, Cl. 340-754.000.

Kani, Tetsuo, to Sony Corporation. Time base corrector. 4,688,111, Cl. 360-36.200.

Kania, Robert C.: *See*—
Casselberry, Robert F.; and Kania, Robert C., 4,686,848, Cl. 73-38.000.

Kanno, Teruo: *See*—
Ise, Yoji; Kanno, Teruo; and Yamaguchi, Akira, 4,687,021, Cl. 137-526.000.

Kansas State University Research Foundation: *See*—
Andra, Bryan K.; Funk, Kent D.; Lang, Clyde J.; and Todd, Philip, 4,686,820, Cl. 56-341.000.

Kanzaki Paper Manufacturing Company Limited: *See*—
Tanaka, Masato; Irii, Shinsuke; and Shiozaki, Tomoharu, 4,688,060, Cl. 503-214.000.

Kaplan, Linda J. Anterior chamber intraocular lens. 4,687,484, Cl. 623-6.000.

Karb, Erich: *See*—
Baumert, Heinz; Schmitt-Maass, Nikolaus; and Karb, Erich, 4,687,254, Cl. 297-481.000.

Kari, Esko T.; Aaltonen, Jarmo; and Suokas, Elias U., to Kemira Oy. Process for the froth-flotation of a phosphate mineral from a phosphate-carbonate ore. 4,687,571, Cl. 209-167.000.

Karl, Rupert: *See*—
Schuller, Edmund; Bohm, Gunther; and Karl, Rupert, 4,687,148, Cl. 242-18.0PW.

Karlstedt, Johan H. Method and device for operation of a heating plant. 4,687,133, Cl. 237-2.00B.

Kaschek, Renate: *See*—
Ricke, Erwin; and Kaschek, Renate, 4,687,489, Cl. 8-506.000.

Kasei Verbatim Corporation: *See*—
Hiramatsu, Kenichi; Nozawa, Hidebumi; and Yamauchi, Takashi, 4,687,536, Cl. 156-556.000.

Kasuga, Akira: *See*—
Miyatsuka, Hajime; Kasuga, Akira; Matsufuji, Akihiro; and Kakuta, Takeshi, 4,687,705, Cl. 428-329.000.

Kaszerman, Philip: *See*—
Citron, Irwin M.; and Kaszerman, Philip, 4,688,251, Cl. 380-34.000.

Kataoka, Kazunori: *See*—
Ogata, Naoya; Sanui, Kohei; Yui, Nobuhiko; Nojima, Kazuhiko; Kataoka, Kazunori; Okano, Teruo; and Sakurai, Yasuhisa, 4,687,831, Cl. 528-64.000.

Kato, Masatake: *See*—
Ikemori, Keiji; Tanaka, Tsunefumi; and Kato, Masatake, 4,687,302, Cl. 350-427.000.
Takahashi, Sadatoshi; Kato, Masatake; and Tsuji, Sadahiko, 4,687,303, Cl. 350-427.000.

Kato, Masayuki: *See*—
Kunugi, Yoshiro; Suzuki, Shinichi; and Kato, Masayuki, 4,688,258, Cl. 381-103.000.

Kato, Takayuki, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Method and apparatus for evaluating the performance of dielectric substances. 4,686,857, Cl. 73-304.00R.

Kato, Tomio, to Sharp Kabushiki Kaisha. Multi-system television receiver. 4,688,082, Cl. 358-21.00R.

Katsuragi, Koji; Ozaki, Hirofumi; Kawahara, Yoshihiro; Matsumoto, Hideki; Tomoe, Tetsuro; and Kobayashi, Kazuhiro, to Mita Industrial Co., Ltd. Ink ribbon cassette for use in printer. 4,687,357, Cl. 400-208.000.

Katzmarzik, Frank J. Gravitationally animated toy bird. 4,687,460, Cl. 446-316.000.

Kaun, Thomas D.; and Smaga, John A., to United States of America, Energy. Bipolar battery with array of sealed cells. 4,687,717, Cl. 429-152.000.

Kavanaugh, James D.: *See—*
Moore, Ronald D.; Kavanaugh, James D.; Phelps, Richard A.; and Howard, Michael C., 4,686,741, Cl. 16-112.000.

Kawabata, Takashi: *See—*
Sakai, Shinji; and Kawabata, Takashi, 4,687,915, Cl. 250-201.000.
Tsunekawa, Tokuichi; Sato, Yuichi; Kawabata, Takashi; and Matsumura, Susumu, 4,687,914, Cl. 250-201.000.

Kawada, Hirohito: *See—*
Takahashi, Toshihiko; and Kawada, Hirohito, 4,688,116, Cl. 360-72.200.

Kawaguchi, Tomohiro, to Fujitsu Limited. Time division exchange for carrying out a loop-back test. 4,688,208, Cl. 370-15.000.

Kawahara, Yoshihiro: *See—*
Katsuragi, Koji; Ozaki, Hirofumi; Kawahara, Yoshihiro; Matsumoto, Hideki; Tomoe, Tetsuro; and Kobayashi, Kazuhiro, 4,687,357, Cl. 400-208.000.

Kawai, Chiaki; Ohta, Minoru; and Inaba, Takahisa, to Nippon Kokan Kabushiki Kaisha. Method for constructing large-scale marine structure. 4,686,919, Cl. 114-45.000.

Kawai, Yasuo; and Yazawa, Kazunaga, to Kabushiki Kaisha Advance Kaihatsu Kenkyujo. Hypotriglyceridemically active polysaccharides. 4,687,764, Cl. 514-54.000.

Kawakami, Osamu: *See—*
Iwamoto, Katsuharu; Kawakami, Osamu; Miyagawa, Hideo; Tashiro, Ikuo; and Ishimura, Takiji, 4,687,927, Cl. 250-231.00P.

Kawakami, Toshio; Mori, Masaaki; and Okada, Chiharu, to Ricoh Company, Ltd. Thermal print head driving system. 4,688,051, Cl. 346-76.0PH.

Kawakubo, Fumio; Takanoo, Miyako; Yukimoto, Sadao; and Isayama, Katsuhiko, to Kanegafuchi Kogaku Kabushiki Kaisha. Polymer and pressure sensitive adhesive composition. 4,687,818, Cl. 525-404.000.

Kawakubo, Katsuhiko: *See—*
Konotsune, Takuo; and Kawakubo, Katsuhiko, 4,687,858, Cl. 548-243.000.

Kawamoto, Yoshimich; Furukawa, Yoshimi; Hamada, Tetsuro; and Serizawa, Mitsuya, to Honda Giken Kogyo Kabushiki Kaisha. Front and rear wheel steering device for vehicle. 4,687,216, Cl. 280-91.000.

Kawasaki, Hiroaki; and Kanetsuna, Nobumitsu, to Futaba Denshi Kogyo Kabushiki Kaisha. Analog display device. 4,688,029, Cl. 340-754.000.

Kawasaki Jukogyo Kabushiki Kaisha: *See—*
Ozu, Tadahiro; Nakayama, Nobuyoshi; and Fujii, Tatsuo, 4,687,136, Cl. 239-8.00X.

Kawasaki Steel Corporation: *See—*
Ogata, Hajime; Nakakouji, Hisatada; Akeda, Yasuhiro; Ichida, Toshio; Irie, Toshio; and Otsuka, Sachiko, 4,687,713, Cl. 428-628.000.

Kay, Bruce F., to United Technologies Corporation. Honeycomb spliced multilayer foam core aircraft composite parts and method for making same. 4,687,691, Cl. 428-73.000.

Kazaoka, Kenichi; Okazaki, Hiroshi; and Inaba, Yasuhisa, to Aisin Seiki Kabushiki Kaisha. Seat cushion for vehicles. 4,687,251, Cl. 297-337.000.

Kehoe, Michael J. File clips. 4,687,227, Cl. 281-45.000.

Kelkar, Anand: *See—*
Musslyn, Eugene F.; and Kelkar, Anand, 4,687,970, Cl. 315-106.000.

Keller, Ernst. Dip tube loader and handler apparatus. 4,686,816, Cl. 53-536.000.

Keller, Paul R. N.; Gawley, Robin A.; and Stewart, Ian M., to Quantel Limited. Video processing system using multi-head disc store. 4,688,106, Cl. 358-342.000.

Kelley Company Inc.: *See—*
Bennett, Mark A., 4,686,806, Cl. 52-309.400.

Kelly, Jeffrey P.: *See—*
Block, Hermann; and Kelly, Jeffrey P., 4,687,589, Cl. 252-73.000.

Kelm, Thomas J.: *See—*
Prindle, Gordon E.; and Kelm, Thomas J., 4,687,465, Cl. 604-61.000.

Kemira Oy: *See—*
Kari, Esko T.; Aaltonen, Jarmo; and Suokas, Elias U., 4,687,571, Cl. 209-167.000.

Kemlage, Bernard M.: *See—*
Joy, Richard C.; Kemlage, Bernard M.; and Mauer, John L., IV, 4,688,069, Cl. 357-34.000.

Kemmerer, Richard R.: *See—*
Morris, William J., deceased; Kemmerer, Richard R.; and Christmas, Byron K., 4,687,806, Cl. 524-765.000.

Kempe, Tomas G. Calcitonin gene related peptide analogs with C-terminal D-amino acid substituents. 4,687,839, Cl. 530-324.000.

Kendall Company, The: *See—*
Huddleston, Elwyn; and Lacana, Richard J., 4,687,794, Cl. 523-351.000.

Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung: *See—*
Besocke, Karl-Heinz, 4,686,847, Cl. 73-23.000.
Iniotakis, Nicolaos; and von der Decken, Claus-Benedict, 4,687,644, Cl. 422-159.000.
Kronschnabel, Hartmut; Goerings, Wilhelm; Bolingen, Johann; and Kleine-Vennekate, Gerd, 4,687,600, Cl. 252-627.000.

Kernforschungszentrum Karlsruhe GmbH: *See—*
Flukiger, Rene; and Gauss, Stephen, 4,687,883, Cl. 174-126.00S.

Kernodle, James W., Sr. Flanged item holder. 4,687,108, Cl. 211-13.000.

Kertesz, Ivan: *See—*
Fenyo, Marta; Kertesz, Ivan; Rozsa, Karoly; and Szego, Peter, 4,686,986, Cl. 128-396.000.

Kerwin, James L.; and Washino, Robert K., to University of California, The Regents of the. Artificial culture of the sexual stage of lagenidium giganteum. 4,687,744, Cl. 435-242.000.

Kettering, Charles W., to Lockheed Corporation. Jump strut landing gear apparatus and system. 4,687,158, Cl. 244-63.000.

Khanna, Ramesh: *See—*
Twardowski, Zbylut J.; Nolph, Karl D.; and Khanna, Ramesh, 4,687,471, Cl. 604-175.000.

Khuddus, Mo A.: *See—*
Russell, David B.; Gitlitz, Melvin H.; Leiner, Howard H.; Khuddus, Mo A.; and Berger, Abe, 4,687,792, Cl. 523-177.000.

Kikuchi, Hiroshi; Hayashi, Kuniharu; Isobe, Minoru; Tanuma, Jiro; and Maekawa, Masanori, to Oki Electric Industry Co., Ltd. Rack mount for a rack and pinion carriage moving mechanism. 4,687,361, Cl. 400-322.000.

Kikuchi, Hiroshi; and Yamauchi, Hitoshi, to Daiichi Seiyaku Co., Ltd. Method for producing liposomes. 4,687,661, Cl. 424-38.000.

Kikuchi, Junichi: *See—*
Takai, Kazuki; Ito, Yukio; Kinoshita, Shigeo; Kikuchi, Junichi; and Fukazawa, Toshihiko, 4,688,122, Cl. 360-96.500.

Kikuchi, Toshiyuki: *See—*
Sotoyama, Kaoru; Sumida, Shizuo; and Kikuchi, Toshiyuki, 4,687,083, Cl. 192-0.076.

Killoway, James M.; Stubbings, David J.; and Sparks, Geoffrey S., to U.S. Philips Corporation. Frequency synthesized multichannel radio apparatus. 4,688,261, Cl. 455-76.000.

Kim, Yeon K. Clutch brake method. 4,687,080, Cl. 192-13.00A.

Kimball, Stephen F.: *See—*
Gagnon, Peter R.; Griffin, Robert M.; and Kimball, Stephen F., 4,687,963, Cl. 313-17.000.

Kimura, Kazuhiro: *See—*
Motegi, Tsutomu; Aoki, Kazuo; and Kimura, Kazuhiro, 4,687,793, Cl. 523-200.000.

Kimura, Kouichi: *See—*
Yamaoka, Hiromasa; Okamoto, Tadashi; Iwasa, Yuzaburo; and Kimura, Kouichi, 4,688,193, Cl. 364-900.000.

Kimura, Tsutomu: *See—*
Tamura, Kaoru; Takano, Masao; and Kimura, Tsutomu, 4,687,932, Cl. 250-327.200.

Kimura, Yoshinori: *See—*
Hirai, Kenji; and Kimura, Yoshinori, 4,688,004, Cl. 331-49.000.

King, Lloyd H., Sr. Solvent cement. 4,687,798, Cl. 524-100.000.

Kingsford, Ted L., to Plough, Inc. Retractable mascara applicator. 4,687,364, Cl. 401-127.000.

Kinkead, Clifford W.; and Kinkead, David W., to Aqua Systems, Inc. Method and apparatus for automatically maintaining a predetermined desired level of water in a swimming pool, and the like. 4,686,718, Cl. 4-508.000.

Kinkead, David W.: *See—*
Kinkead, Clifford W.; and Kinkead, David W., 4,686,718, Cl. 4-508.000.

Kinoshita, Hiroyuki; and Ono, Michihiro, to Tokyo Shibaura Denki Kabushiki Kaisha. MOS type semiconductor device. 4,688,065, Cl. 357-23.130.

Kinoshita, Kimiaki: *See—*
Obitsu, Takeo; Igaki, Tetsuo; Kinoshita, Kimiaki; Nanbu, Morio; and Satoh, Shinichi, 4,687,862, Cl. 549-224.000.

Kinoshita, Shigeo: *See—*
Takai, Kazuki; Ito, Yukio; Kinoshita, Shigeo; Kikuchi, Junichi; and Fukazawa, Toshihiko, 4,688,122, Cl. 360-96.500.

Kinsey, Robert, to Kombilift Limited. Load lifting apparatus with overturning prevention means. 4,687,406, Cl. 414-701.000.

Kipnis, Issy, to Avantek, Inc. Self-oscillating mixer with Darlington transistors. 4,688,005, Cl. 331-117.00R.

Kirchhoff, Robert A.; and Hahn, Stephen F., to Dow Chemical Company, The. Alkynyl-bridged poly(arylcyclobutene) resins. 4,687,823, Cl. 526-284.000.

Kirk, Thomas K.: *See—*
Farrell, Roberta L.; Kirk, Thomas K.; and Tien, Ming, 4,687,741, Cl. 435-189.000.

Kirkham, Kathleen E.: *See—*
Sutton, Robert F.; and Kirkham, Kathleen E., 4,687,556, Cl. 204-29.000.

Kish, William C.: *See—*
Dougan, Donald R.; Peters, Gerald W.; and Kish, William C., 4,687,145, Cl. 241-57.000.

Kishiro, Shigeru: *See—*
Nakamura, Katsunori; Kurano, Akira; Shiroyanagi, Yoshiro; and Kishiro, Shigeru, 4,688,221, Cl. 371-13.000.

Kitagawa, Hisashi: *See—*
Ginnaga, Akihiro; Koba, Hiroshi; Sakuma, Shin; Kitagawa, Hisashi; Yamada, Akira; and Suzuki, Yoji, 4,687,738, Cl. 435-68.000.

Kitaguchi, Hisao, to New Cosmos Electric Co., Ltd. Semiconductor type gas sensor having two terminals. 4,688,014, Cl. 338-34.000.

Kitahara, Toshihiro: *See—*
Noda, Yasushi; Kitahara, Toshihiro; and Tsuyuguchi, Hiroshi, 4,688,131, Cl. 360-137.000.

Kitamura, Shiro: *See—*
Shiraishi, Takashi; and Kitamura, Shiro, 4,687,328, Cl. 356-384.000.

Klambauer, Manfred, to Voest-Alpine Aktiengesellschaft. Lock for the transport of bulk material. 4,687,408, Cl. 414-217.000.

Klanner, Wilfried; Schmaler, Dieter H.; Wetter, Hermann; Felsch, Bernhard; and Czernakowski, Waldemar, to Romer-Britax Autogurte GmbH; and ADAC E.V. Adjustable toddler car seat. 4,687,255, Cl. 297-488.000.

Kleine-Vennekate, Gerd: *See*—
Kronschnabel, Hartmut; Goerings, Wilhelm; Bolingen, Johann; and Kleine-Vennekate, Gerd, 4,687,600, Cl. 252-627.000.

Kleinecke, John D.; Farag, Samir F.; and Little, Thomas R., to Siemens-Allis, Inc. Shutter assembly for a motor controller. 4,688,144, Cl. 361-345.000.

Kleinwachter, Jurgen, to Bomin Solar GmbH & Co. KG. Apparatus for heating water by solar energy. 4,686,960, Cl. 126-422.000.

Kleiss, Karlheinz: *See*—
Renner, Hermann; Kleiss, Karlheinz; and Schlodder, Rainer, 4,687,514, Cl. 75-109.000.

Klepacki, Frank H. Elastomeric securing means for orthodontic appliances. 4,687,441, Cl. 433-8.000.

Klinkhamer, Arend J.: *See*—
Pals, Jan A.; and Klinkhamer, Arend J., 4,686,759, Cl. 437-51.000.

Klockner Ferromatik Desma GmbH: *See*—
Stengelin, Ernst, 4,687,431, Cl. 425-229.000.

Klodnicki, Edward J.: *See*—
Cotton, Robert V.; and Klodnicki, Edward J., 4,688,108, Cl. 358-257.000.

Knauer, Adolf: *See*—
Pieper, Helmut; Knauer, Adolf; and Sorg, Helmut, 4,687,504, Cl. 65-326.000.

Knight, Brian V.: *See*—
Eriksson, Lars; and Knight, Brian V., 4,686,801, Cl. 52-81.000.

Knirsch, Franco; and Gianolini, Giovanni, to Ing. C. Olivetti & C., S.p.A. Heat sensitive inked element for high speed thermal printers. 4,687,701, Cl. 428-216.000.

Knittel, Ronald, to AGL Bau-Laser Gerate Vertriebs GmbH. Construction laser, in particular canal construction laser. 4,688,230, Cl. 372-109.000.

Knowles, Larry F. Removable speedbump-cover. 4,687,370, Cl. 404-15.000.

Knowles, Vernon L.; Wilcox, Roger V.; and Jackson, Bruce J., to Hewlett-Packard Company. Servo gain compensation in a disc drive. 4,688,118, Cl. 360-75.000.

Knud Erik Westergaard: *See*—
Ostergaard, Tage V., 4,687,138, Cl. 239-126.000.

Knudsen, Donald C. Digital delay generator for sonar and radar beam formers. 4,688,045, Cl. 342-377.000.

Knurek, Thomas A.; Houston, Terry L.; and Hipsher, Gary L., to Cooper Tire & Rubber Company. Mount for controlling or isolating vibration. 4,687,188, Cl. 267-140.100.

Koba, Hiroshi: *See*—
Ginnaga, Akihiro; Koba, Hiroshi; Sakuma, Shin; Kitagawa, Hisashi; Yamada, Akira; and Suzuki, Yoji, 4,687,738, Cl. 435-68.000.

Kobayashi, Hideyuki, to Aisin Seiki Kabushiki Kaisha. Power delivery system having a continuously variable ratio transmission. 4,686,871, Cl. 74-866.000.

Kobayashi, Kazuhiro: *See*—
Katsuragi, Koji; Ozaki, Hirofumi; Kawahara, Yoshihiro; Matsumoto, Hideki; Tomoe, Tetsuro; and Kobayashi, Kazuhiro, 4,687,357, Cl. 400-208.000.

Kobayashi, Kesanao: *See*—
Toyama, Tadao; Kobayashi, Kesanao; Koike, Mitsuru; and Tamoto, Koji, 4,687,727, Cl. 430-175.000.

Kober, Heinrich: *See*—
Brinkmeyer, Hermann; Hubler, Gerhard; Perrey, Hermann; Nippe, Burkhard; and Kober, Heinrich, 4,687,709, Cl. 428-425.900.

Koboshi, Shigeharu: *See*—
Ishikawa, Masao; Koboshi, Shigeharu; and Kuse, Satoru, 4,687,731, Cl. 430-372.000.

Koch, Joseph W. M.: *See*—
Schmidt, Gunther; and Koch, Joseph W. M., 4,687,438, Cl. 432-57.000.

Koga, Tadao; Sugimori, Mitsuru; Terasaki, Masanori; Maenosono, Tsukasa; Tsushima, Satoru; Yoshida, Kazuo; Kuriwaki, Tetsusho; and Hirado, Miharu, to Daiichi Koshuha Kogyo Kabushiki Kaisha; and Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Induction heating method and apparatus for relieving residual stress in welded joints in pipe line. 4,687,894, Cl. 219-10.430.

Kohara, Takao: *See*—
Inoue, Masaru; Ida, Masao; and Kohara, Takao, 4,686,863, Cl. 74-425.000.

Kohmo, Hidenori: *See*—
Taniguti, Ryosuke; Kohmo, Hidenori; Kubo, Manabu; and Ikeda, Takashi, 4,688,184, Cl. 364-560.000.

Kohonen, Raimo: *See*—
Lankinen, Matti; Engdahl, Holger; Kohonen, Raimo; Niskanen, Jukka; and Kosonen, Markku, 4,687,583, Cl. 210-739.000.

Kohyama, Mitsuaki, to Kabushiki Kaisha Toshiba. Developing device. 4,686,934, Cl. 118-651.000.

Koike, Mitsuru: *See*—
Toyama, Tadao; Kobayashi, Kesanao; Koike, Mitsuru; and Tamoto, Koji, 4,687,727, Cl. 430-175.000.

Koinuma, Hiroyuki, to Kabushiki Kaisha Toshiba. Schmitt circuit with MIS field effect transistors. 4,687,955, Cl. 307-290.000.

Koishi, Kenji; Matsuo, Tamotsu; and Satoh, Isao, to Matsushita Electric Industrial Co., Ltd. Optical recording and reproducing apparatus. 4,688,203, Cl. 369-48.000.

Koishi, Toshio; Tanaka, Isao; Yasumura, Takashi; and Nishikawa, Yukitoshi, to Central Glass Company, Limited. Optical fiber having polymethacrylate core and fluoro-copolymer cladding. 4,687,295, Cl. 350-96.340.

Kojima, Masaru: *See*—
Ozaki, Sei; Futamura, Shoji; Kojima, Masaru; and Inoue, Satoru, 4,687,433, Cl. 425-464.000.

Kojima, Takao; Nakano, Akira; Matsuura, Toshitaka; and Takami, Akio, to NGK Spark Plug Co., Ltd. Gas sensor with ceramics substrate having surface-carried ceramics particles. 4,688,015, Cl. 338-34.000.

Kojima, Yoshimi: *See*—
Ehara, Shaw; Kojima, Yoshimi; Imada, Eiji; Hayakawa, Takashi; and Matsuyama, Toshiro, 4,687,724, Cl. 430-84.000.

Kojola, Hannu, to Wallac Oy. Photomultiplier used in liquid scintillation counting with specimen-encircling curved photocathode. 4,687,921, Cl. 250-207.000.

Kolbenschmidt Aktiengesellschaft: *See*—
Weiss, Franz; Eschenweck, Dieter; and Stark, Manfred, 4,687,043, Cl. 164-97.000.

Kollmeier, Hans-Joachim; and Langenhagen, Rolf-Dieter, to Th. Goldschmidt AG. Process for the preparation of flexible polyurethane foams. 4,687,786, Cl. 521-110.000.

Kombilift Limited: *See*—
Kinsey, Robert, 4,687,406, Cl. 414-701.000.

Komuro, Katsusuke, to Honda Giken Kogyo Kabushiki Kaisha. Instrument display system. 4,687,072, Cl. 180-219.000.

Kon, Takao; Yano, Kensaku; Kakegawa, Masayuki; and Shibata, Hidenori, to Kabushiki Kaisha Toshiba. Solid state image sensor with means for removing excess photocharges. 4,688,098, Cl. 358-213.190.

Kondo, Kazuo; and Maruyama, Satoshi, to Okura Industrial Co., Ltd. Method of producing biaxially oriented tubular polyetheretherketone films. 4,687,615, Cl. 264-557.000.

Konishiroku Photo Industry Co., Ltd.: *See*—
Ishikawa, Masao; Koboshi, Shigeharu; and Kuse, Satoru, 4,687,731, Cl. 430-372.000.

Konotsune, Takuo; and Kawakubo, Katsuhiko, to Sankyo Company Limited. Organic acid esters of 4-benzoyl-5-hydroxy(mercapto)-pyrazoles. 4,687,858, Cl. 548-243.000.

Konrad Doppelmayr & Sohn Maschinefabrik Gesellschaft m.b.H & Co. KG.: *See*—
Meindl, Bernd, 4,686,906, Cl. 104-209.000.

Korf, Dieter: *See*—
Sarstedt, Walter; and Korf, Dieter, 4,687,479, Cl. 604-403.000.

Korsunsky, Iosif: *See*—
Grabbe, Dimitry; and Korsunsky, Iosif, 4,687,278, Cl. 439-842.000.

Kortec AG: *See*—
Wells, William, 4,687,440, Cl. 432-194.000.

Kortenbach Verwaltungs-und Beteiligungsgesellshcaft mgH & Co.: *See*—
Schultes, Tilmann; and Seidel, Joachim, 4,687,012, Cl. 135-75.000.

Koshoffer, John M.; Pfefferle, Richard A.; and Larson, Harold A., to United States of America, Air Force. Mixed flow augmentor incorporating a fuel/air tube. 4,686,826, Cl. 60-261.000.

Kosinska, Wanda; Grzelak, Dorota; Penczek, Irena; and Bialy, Jan, to Enichem, S.p.A. Compositions of polyphenylene oxide or of mixtures of polyphenylene oxide with a styrene polymer. 4,687,799, Cl. 524-100.000.

Koskimies, Jouni: *See*—
Ilmoniemi, Erkki; Koskimies, Jouni; Lyytinen, Markku; Pitkajarvi, Kari; and Ottelin, Esa, 4,687,548, Cl. 162-216.000.

Kosonen, Markku: *See*—
Lankinen, Matti; Engdahl, Holger; Kohonen, Raimo; Niskanen, Jukka; and Kosonen, Markku, 4,687,583, Cl. 210-739.000.

Kotilinek, Mark P.: *See*—
Holland, Brian J.; and Kotilinek, Mark P., 4,687,279, Cl. 439-578.000.

Kotitschke, Gerhard; and Benz, Wilheim, to J. M. Voith GmbH. Device for threading a transfer strip of a paper web through the drying cylinder section of a paper machine. 4,686,778, Cl. 34-117.000.

Kotobuki & Co., Ltd.: *See*—
Kageyama, Hidehei, 4,687,363, Cl. 401-65.000.

Kottwitz, Bernd; and Loser, Norbert, to SKF GmbH. Axial joint arrangement with integrated seal. 4,687,347, Cl. 384-141.000.

Koze, Jeffrey T., to American Telephone and Telegraph Company, AT&T Technologies, Inc. Back sealing of silicon wafers. 4,687,682, Cl. 427-94.000.

Koziol, Walter, to Modern Home Products Corp. Gas nozzle attachment. 4,686,957, Cl. 126-41.00R.

Kraftwerk Union Aktiengesellschaft: *See*—
von Bernus, Ludwig; Bogelein, Georg; and Waldhutter, Rudolf, 4,687,992, Cl. 324-232.000.

Krahe, Ronald P.: *See*—
Kaehler, Kristine M.; Krahe, Ronald P.; Miraldi, Peter T.; and McBride, Richard A., 4,687,635, Cl. 422-26.000.

Krammer, Gunter: *See*—
Jaritz, Erich; and Krammer, Gunter, 4,686,877, Cl. 83-177.000.

Kraus, Charles J.; Stoller, Herbert I.; and Wu, Leon L., to International Business Machines Corporation. Multilayered interposer board for powering high current chip modules. 4,688,151, Cl. 361-405.000.

Krausse, Peter, to Siemens Aktiengesellschaft. Light waveguide plug connector. 4,687,292, Cl. 350-96.210.

Kreeger, Elsmer W., to Pinckney Molded Plastics, Inc. Reel storage container. 4,687,100, Cl. 206-403.000.

Krejci, Paul: *See*—
Maget, Henri J. R.; and Krejci, Paul, 4,687,423, Cl. 417-379.000.

Krieg, James C., to McDonnell Douglas Corporation. Electromagnetic communications and switching system. 4,688,037, Cl. 340-825.720.

Kriegner, Othmar; Lang, Franz; Holleis, Gunter; Schwaha, Karl; and Granitz, Fritz, to Voest-Alpine International Corporation. Jet nozzle. 4,687,141, Cl. 239-520.000.

Krill, Jerry A., to Johns Hopkins University, The. Air inlet for internal cooling of overmoded waveguide. 4,688,007, Cl. 333-137.000.

Krinski, Thomas L.: *See*—
Steinmetz, Alan L.; and Krinski, Thomas L., 4,687,826, Cl. 527-201.000.

Krishnamurthy, Ramachandran: *See*—
Maclean, Donald L.; Krishnamurthy, Ramachandran; and Lerner, Steven L., 4,687,498, Cl. 62-17.000.

Kristedja, David H.: *See*—
Wedertz, Larry D.; Ross, Oakley G.; and Kristedja, David H., 4,688,040, Cl. 342-3.000.

Kroener, Michael: *See*—
Brunnmueller, Fritz; and Kroener, Michael, 4,687,848, Cl. 544-336.000.

Kronschnabel, Hartmut; Goerings, Wilhelm; Bolingen, Johann; and Kleine-Vennekate, Gerd, to Kernforschungsanlage Julich GmbH. Process for the separation of coated nuclear fuel particles from a graphitic matrix and installation for implementing the process. 4,687,600, Cl. 252-627.000.

Kruncos, Francis E., to Brunswick Corporation. Two and four cycle digital tachometer. 4,687,991, Cl. 324-169.000.

Kubo, Kiichirou; and Kanazaki, Mikio, to Hitachi, Ltd. Liquid crystal display device. 4,687,300, Cl. 350-336.000.

Kubo, Manabu: *See*—
Taniguti, Ryosuke; Kohmo, Hidenori; Kubo, Manabu; and Ikeda, Takashi, 4,688,184, Cl. 364-560.000.

Kubota, Kunio: *See*—
Mitarai, Akira; and Kubota, Kunio, 4,688,173, Cl. 364-405.000.

Kubota Limited: *See*—
Umeda, Tatsutoshi; Tani, Yoshio; Kaai, Takeshi; Nakano, Keiichi; and Izui, Yoshio, 4,686,946, Cl. 123-90.410.

Kuchnir, Moyses; and Mills, Frederick E., to United States of America, Energy. Beam current sensor. 4,687,987, Cl. 324-71.300.

Kuehneman, Gary; and Leavitt, Joel, to United States Data Corporation. Reconfigurable keyboard. 4,688,020, Cl. 340-365.0VL.

Kufta, George; and Tait, David S., to Zenith Electronics Corporation. IV SAP/stereo audio system. 4,688,252, Cl. 381-4.000.

Kuka Wehtechnik GmbH: *See*—
Schiele, August, 4,686,887, Cl. 89-33.160.

Kukes, Simon G.; and Parrott, Stephen L., to Phillips Petroleum Company. Catalytic hydrofining of oil. 4,687,568, Cl. 208-251.00H.

Kukes, Simon G.: *See*—
Parrott, Stephen L.; Kukes, Simon G.; and Brandes, Karlheinz K., 4,687,757, Cl. 502-220.000.

Kunita, Masako: *See*—
Ohshima, Kohichi; Kageyama, Yoshiyuki; Ide, Yukio; Fujimura, Itaru; and Kunita, Masako, 4,687,723, Cl. 430-65.000.

Kuno, Akira: *See*—
Matsui, Kazuma; Hattori, Yoshiyuki; Imani, Yuichi; Kuno, Akira; and Nomura, Yoshihisa, 4,687,260, Cl. 303-119.000.

Kunugi, Yoshiro; Suzuki, Shinichi; and Kato, Masayuki, to Pioneer Electronic Corporation. Automatic graphic equalizer. 4,688,258, Cl. 381-103.000.

Kunz, Gerhard. Process and apparatus for treatment of fluids, particularly demineralization of aqueous solutions. 4,687,561, Cl. 204-182.500.

Kuper, Hans-Heinrich; and Gronebaum, Theo. Machine for processing plywood sheets. 4,687,035, Cl. 144-2.00R.

Kuper, Nina M.; and Kalnajs, Janis I. Decorative tile. 4,687,694, Cl. 428-156.000.

Kuramoto, Yasuo. Wax ring tube with graduations. 4,687,178, Cl. 249-53.00R.

Kurano, Akira: *See*—
Nakamura, Katsunori; Kurano, Akira; Shiroyanagi, Yoshiro; and Kishiro, Shigeru, 4,688,221, Cl. 371-13.000.

Kurebayashi, Kimie: *See*—
Yoshimura, Motokazu; Hirata, Koichi; and Kurebayashi, Kimie, 4,688,192, Cl. 364-900.000.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
Shigeta, Masatomo; Saitoh, Kuniyuki; and Fukuda, Hiroyuki, 4,687,607, Cl. 264-29.500.
Teramoto, Yoshikichi; Nakamura, Kenichi; and Murayama, Naohiro, 4,687,803, Cl. 524-413.000.

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Koga, Tadao; Sugimori, Mitsuru; Terasaki, Masanori; Maenosono, Tsukasa; Tsushima, Satoru; Yoshida, Kazuo; Kuriwaki, Tetsusho; and Hirado, Miharu, 4,687,894, Cl. 219-10.430.

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Kusaka, Yosuke; and Utagawa, Ken, to Nippon Kogaku K. K. Focus detecting device for removing vignetting effects. 4,687,917, Cl. 250-201.000.

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Kuwabara, Akira: *See*—
Mitsuka, Ikuo; and Kuwabara, Akira, 4,687,944, Cl. 250-578.000.

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Lahalih, Shawqui; Akashah, Saed-el-Deen; and Al-Hajjar, Farouk, 4,686,790, Cl. 47-9.000.

Kwake, John P. Theatre structure with individual multiple lounges. 4,686,799, Cl. 52-8.000.

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Clendinning, Robert A.; and Kwiatkowski, George T., 4,687,833, Cl. 528-125.000.

Kyowa Chemical Industry Co., Ltd.: *See*—
Miyata, Shigeo, 4,686,791, Cl. 47-29.000.

Labate, Michael D.; and Perri, Joseph A., to Insul Company, Inc. Device for introducing gas into molten metal in a wide annular stream. 4,687,184, Cl. 266-270.000.

Laby, Ralph H.; and Lance, Mark A., to Commonwealth Scientific and Industrial Research Organization. Controlled release capsule. 4,687,480, Cl. 604-891.000.

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Ghommidh, Charles; Navarro, Jean-Marie; Girardon, Philippe; and Amen, Jean, 4,687,668, Cl. 426-17.000.
Vitkovsky, Eugene C., 4,687,672, Cl. 426-524.000.

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Lang, David M.; and Lewitzke, Richard W., to Becor Western Inc. Casing tong assembly. 4,686,873, Cl. 81-57.350.

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Kriegner, Othmar; Lang, Franz; Holleis, Gunter; Schwaha, Karl; and Granitz, Fritz, 4,687,141, Cl. 239-520.000.

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Kollmeier, Hans-Joachim; and Langenhagen, Rolf-Dieter, 4,687,786, Cl. 521-110.000.

Langmaid, Roger N.: *See*—
Eichelberger, Edward B.; Langmaid, Roger N.; Lindbloom, Eric; Motika, Franco; Sinchak, John L.; and Waicukauski, John A., 4,687,988, Cl. 324-73.0AT.

Langner, Carl G., to Shell Oil Company. Method and apparatus for subsea flexible conduit installation. 4,687,377, Cl. 405-169.000.

Lankinen, Matti; Engdahl, Holger; Kohonen, Raimo; Niskanen, Jukka; and Kosonen, Markku, to Enso-Gutzeit Oy. Procedure for filtering lime sludge meant to be regenerated to lime. 4,687,583, Cl. 210-739.000.

Lanzoni, Thomas P.: *See*—
Carini, Richard P.; Donnelly, James A.; Ellis, Joseph J., Jr.; and Lanzoni, Thomas P., 4,688,033, Cl. 340-800.000.

Laporte Industries Limited: *See*—
Comyns, Alan E.; Morris, Gareth W.; and Sankey, John P., 4,687,871, Cl. 556-138.000.

Larouere, Paula J.: *See*—
Cellier, Francis; Graulty, Robert T.; Johnson, Wendell L.; Batson, David M.; Limpert, John C.; Wu, Christopher K. C.; Bucher, George D.; John, Clarence D., Jr.; Steinkirchner, John E.; Larouere, Paula J.; Shah, Hemant H.; and Williams, Robert A., 4,687,605, Cl. 264-0.500.

Larson, Harold A.: *See*—
Koshoffer, John M.; Pfefferle, Richard A.; and Larson, Harold A., 4,686,826, Cl. 60-261.000.

Larson, Marlow W., to Browning Arms Company. Compound archery bows. 4,686,955, Cl. 124-23.00R.

Larsson, Karl O. A. H., to ISG AG. Breastfeeding assistance device. 4,687,466, Cl. 604-82.000.

Larsson, Lars; and Svesson, Bengt. Exercise apparatus with dual pivotal motion and cylinder resistance assembly. 4,687,197, Cl. 272-72.000.

Lasberg, Ingo; and Druckenbrodt, Wolf-Gunther, to Alkem GmbH. Glove box. 4,687,941, Cl. 250-506.100.

Laski, Frank A.: *See*—
Sharp, Phillip A.; Capecchi, Mario R.; RajBhandary, Uttam L.; and Laski, Frank A., 4,687,737, Cl. 435-68.000.

Latty, James A., to Dresser Industries, Inc. Fuel admixture for a catalytic combustor. 4,687,491, Cl. 44-51.000.

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Pranch, Anatoly S., 4,687,273, Cl. 439-411.000.

Laughner, Michael K., to Dow Chemical Company, The. Polyurethane elastomers prepared from high equivalent weight polyahls. 4,687,851, Cl. 544-398.000.

Laurien, Rolf: *See*—
Mateika, Werner D.; Laurien, Rolf; and Liehr, Manfred R., 4,687,646, Cl. 422-248.000.

Lawrence, Glen S.: *See*—
Colegrove, Russell K.; and Lawrence, Glen S., 4,687,902, Cl. 219-121.0ET.

Leary, Jeffry J.: *See*—
Ward, David C.; Leary, Jeffry J.; and Brigati, David J., 4,687,732, Cl. 435-6.000.

Leavitt, Joel: *See*—
Kuehneman, Gary; and Leavitt, Joel, 4,688,020, Cl. 340-365.0VL.

Lecheheb, Ammar: *See*—
Doyle, James J.; and Lecheheb, Ammar, 4,688,049, Cl. 346-1.100.

Ledebuhr, Arno G., to Hughes Aircraft Company. Full-color projector system with a tricolor-separating prism. 4,687,301, Cl. 350-401.000.

Lee, Jin-Hyo: *See*—
Chai, Sang-Hoon; and Lee, Jin-Hyo, 4,686,762, Cl. 437-36.000.

Lee, Robert D.: *See*—
Davis, Harold L.; and Lee, Robert D., 4,687,989, Cl. 324-758.00R.

Lee, Ronald B.: *See*—
Eilers, Carl G.; Lee, Ronald B.; and Turner, Rudolf, 4,688,246, Cl. 380-9.000.

Leedecke, Charles J.: *See*—
Singhdeo, Narendra N.; Pryor, Michael J.; Leedecke, Charles J.; and Masse, Norman G., 4,687,540, Cl. 156-630.000.

Leeds, Donald H.: *See*—
Schaffner, Donald R.; and Leeds, Donald H., 4,688,239, Cl. 378-141.000.

Lefevre, Herve C., to Leland Stanford Junior University, The Board of Trustees of the. Fiber optic rotation sensor with extended dynamic range. 4,687,330, Cl. 356-350.000.

Leff, Kenneth J.: *See*—
Galvin, Aaron A.; Mason, Douglas L.; Leff, Kenneth J.; Schide, John N.; and Giffone, Ralph A., 4,687,924, Cl. 250-216.000.

Leger, Raymond A., to Cherry Corporation, The. Electrical appliance interlock switch with improved isolation means. 4,687,889, Cl. 200-61.620.

Leggett, Henry H. Wire-line controlled down-hole shut-in tool for wells. 4,687,055, Cl. 166-72.000.

Leggett & Platt, Incorporated: *See*—
Zapletal, Henry; Wentzek, Horst F.; and Chembakaffery, George M., 4,686,753, Cl. 29-281.400.

Legrand, Pierre. Public transport vehicle. 4,686,908, Cl. 105-315.000.

Le Hir, Yves: *See*—
Jegousse, Michel; and Le Hir, Yves, 4,687,378, Cl. 405-171.000.

Leigh-Monstevens, Keith V.; Wrobleski, David L.; Nix, Richard A.; and Rei, Mark W., to Automotive Products plc. Clutch release apparatus for pull type clutches. 4,687,084, Cl. 192-85.0CA.

Leiner, Howard H.: *See*—
Russell, David B.; Gitlitz, Melvin H.; Leiner, Howard H.; Khuddus, Mo A.; and Berger, Abe, 4,687,792, Cl. 523-177.000.

Leipold, Ludwig: *See*—
Tihanyi, Jenoe; Fellinger, Christine; and Leipold, Ludwig, 4,688,071, Cl. 357-41.000.

Leisman, Gerald; and Hed, A. Zeev. Apparatus and method for ligating a body vessel. 4,686,983, Cl. 128-325.000.

Lekebusch, Ronald C.; O'Neil, John T., Jr.; and Muzeroll, Martin E., to GTE Products Corporation. Method and apparatus for position orientation of a metal halide lamp base assembly. 4,687,453, Cl. 445-4.000.

Leland Stanford Junior University, The Board of Trustees of the: *See*—
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Le Martret, Odile: *See*—
Clemence, Francois; and Le Martret, Odile, 4,687,857, Cl. 548-195.000.

Lemmer, Helmut; and Risthaus, Josef, to Square D Starkstrom GmbH. Motor safety switch. 4,688,011, Cl. 335-159.000.

Lemonier, Michel G.; and Petit, Maurice L. J., to U.S. Philips Corporation. Image detector operable in day or night modes. 4,687,922, Cl. 250-213.0VT.

Lemper, Herbert, to Kabushiki Kaisha Kobe Seiki Sho. Top roller apron in a continuous casting assembly. 4,687,046, Cl. 164-442.000.

Lempio, Paul S. Golf club including detachable golf ball retriever. 4,687,204, Cl. 273-162.00E.

Lenfeldt, Lars, to Z-Lyften Produktion AB. Torque-sensing clutch. 4,687,082, Cl. 192-55.000.

Lenz, Werner; Sander, Hans; and Moeller, Dieter, to BASF Aktiengesellschaft. Production of coatings. 4,687,813, Cl. 525-131.000.

Leopold, Howard S., to Eagle Electric Mfg. Co., Inc. Duplex electrical receptacle with replaceable surge suppressor. 4,688,135, Cl. 361-118.000.

Le Page, Jean-Francois: *See*—
Quang, Dang V.; Pradel, Claude; Euzen, Jean P.; and Le Page, Jean-Francois, 4,687,656, Cl. 423-361.000.

Lerner, Michael A.: *See*—
Gray, James P.; Hansen, Peter J.; Lerner, Michael A.; and Pozefsky, Mark, 4,688,035, Cl. 340-825.520.

Lerner, Steven L.: *See*—
Maclean, Donald L.; Krishnamurthy, Ramachandran; and Lerner, Steven L., 4,687,498, Cl. 62-17.000.

Le Roux, Donald F.: *See*—
De Felice, Charles P.; and Le Roux, Donald F., 4,688,243, Cl. 378-187.000.

Letize, Raymond A.: *See*—
Williams, Ann S.; and Letize, Raymond A., 4,687,545, Cl. 156-651.000.

Levitt, George, to Du Pont de Nemours, E. I., and Company. Agricultural sulfonamides. 4,687,507, Cl. 71-92.000.

Lewerenz, Hans-Joachim: *See*—
Goslowsky, Hans; Lewerenz, Hans-Joachim; Fiechter, Manuel S.; and Husemann, Karl-Dieter, 4,687,881, Cl. 136-255.000.

Lewis, Henry G., Jr.: *See*—
Campbell, Edward R., III; and Lewis, Henry G., Jr., 4,688,096, Cl. 358-167.000.

Lewitzke, Richard W.: *See*—
Lang, David M.; and Lewitzke, Richard W., 4,686,873, Cl. 81-57.350.

Leybold-Heraeus GmbH: *See*—
Colegrove, Russell K.; and Lawrence, Glen S., 4,687,902, Cl. 219-121.0ET.

Leyck, Sigurd: *See*—
Wendel, Armin; Leyck, Sigurd; Wetzig, Helmut; Hager, Jorg; Durr, Manfred; and Ghyczy, Miklos, 4,687,766, Cl. 514-78.000.

Liao, Tung-Ping D.: *See*—
Hou, Kenneth C.; and Liao, Tung-Ping D., 4,687,820, Cl. 525-54.100.

Lichti, Robert, to Metals, Ltd. Device for moving objects in a closed container. 4,687,400, Cl. 414-4.000.

Lieberman, Burton E.: *See*—
Weil, David M.; Lieberman, Burton E.; and Adams, Ronald F., 4,687,698, Cl. 428-209.000.

Liehr, Manfred R.: *See*—
Mateika, Werner D.; Laurien, Rolf; and Liehr, Manfred R., 4,687,646, Cl. 422-248.000.

Lietz, Dennis E.; and Whittern, Carleen C., to Stepan Company. Emulsifiers useful in the manufacture of high solids emulsion polymers. 4,687,594, Cl. 252-352.000.

Liles, Barry J., to Raytheon Company. Semiconductor structure and method of manufacture. 4,688,062, Cl. 357-22.000.

Lillquist, Robert D., to General Electric Company. Imaging pyrometer. 4,687,344, Cl. 374-124.000.

Lim, Drahoslav; Jacoby, Stephen; Homick, Richard; and Powers, Frank, to Barnes-Hind, Inc. Intraocular lens with leg means having compressible regions and/or color. 4,687,485, Cl. 623-6.000.

Limpert, John C.: *See*—
Cellier, Francis; Graulty, Robert T.; Johnson, Wendell L.; Batson, David M.; Limpert, John C.; Wu, Christopher K. C.; Bucher, George D.; John, Clarence D., Jr.; Steinkirchner, John E.; Larouere, Paula J.; Shah, Hemant H.; and Williams, Robert A., 4,687,605, Cl. 264-0.500.

Lin, Jui C. Tubular door lock with an adjustable device for setting the dead bolt. 4,687,239, Cl. 292-172.000.

Lin, Leroy C.: *See*—
Cordova, David S.; Rowan, Hugh H.; and Lin, Leroy C., 4,687,796, Cl. 523-466.000.

Lin, Shaow B.; Bowman, Lyle M.; Chandrasekaran, S. Kumar; and Harvey, Thomas B., III, to Sola U.S.A. Inc. Surface treatment of soft contact lenses. 4,687,816, Cl. 525-279.000.

Lin, Wayne H. T., to Mallinckrodt, Inc. Phenanthridinium ester as a labelling compound in luminometric immunoassay. 4,687,747, Cl. 436-518.000.

Lin, Wen T., to Jerrold Electronics Corp. D.C.-coupled video clamping circuit. 4,688,097, Cl. 380-15.000.

Lindblom, Yngve S. Process for preparing high temperature materials. 4,687,678, Cl. 427-34.000.

Lindbloom, Eric: *See*—
Eichelberger, Edward B.; Langmaid, Roger N.; Lindbloom, Eric; Motika, Franco; Sinchak, John L.; and Waicukauski, John A., 4,687,988, Cl. 324-73.0AT.

Linde Aktiengesellschaft: *See*—
Weber, Gunter, 4,687,496, Cl. 55-73.000.

Linhardt, Wilbur J.: *See*—
Wong, Mon N.; and Linhardt, Wilbur J., 4,688,006, Cl. 333-113.000.

Linnerbauer, Horst: *See*—
Spinner, Georg; Pitschi, Franz-Xaver; and Linnerbauer, Horst, 4,687,272, Cl. 439-271.000.

Liou, Ming J.: *See*—
Suh, Nam P.; Saka, Nannaji; and Liou, Ming J., 4,687,274, Cl. 439-426.000.

Lipp, Alfred: *See*—
Hunold, Klaus; Lipp, Alfred; Reinmuth, Klaus; Arnold, Peter; and Napholcz, Johannes, 4,687,655, Cl. 423-344.000.

Lippold, Joseph H., Jr.: *See*—
Heaton, Harley L., III; Lippold, Joseph H., Jr.; McHale, Edward T.; and Skolnik, Edward G., 4,687,490, Cl. 44-51.000.

Lipson, Erik; and Sansom, Melanie J. Tubular eyeglass frame. 4,687,306, Cl. 351-51.000.

Litch, Ernest W., III: *See*—
Brahmavar, Subhash M.; and Litch, Ernest W., III, 4,687,977, Cl. 318-492.000.

Little, Thomas R.: *See*—
Kleinecke, John D.; Farag, Samir F.; and Little, Thomas R., 4,688,144, Cl. 361-345.000.

Liu, Kenneth C., to United States of America, Energy. Self-aligning hydraulic piston assembly for tensile testing of ceramic. 4,686,860, Cl. 73-856.000.

Liu, Michael S.; and Hoefflinger, Bernd, to Honeywell Inc. Three-dimensional CMOS using selective epitaxial growth. 4,686,758, Cl. 437-34.000.

Liu, Wen H. Cooling tower. 4,687,603, Cl. 261-24.000.

Liu, Yaguang. Pharmaceutical composition for increasing immunity and decreasing side effects of anticancer chemotherapy. 4,687,761, Cl. 514-26.000.

Lochbihler, Edmund: *See*—
Ernst, Hans-Hellmut; and Lochbihler, Edmund, 4,687,253, Cl. 297-478.000.

Lock, Michael W. B., to Internationale Octrooi Maatschappij "Octropa" BV. Transducers and control means. 4,688,199, Cl. 367-137.000.

Lockett, G. Jeffrey. Baby toy. 4,687,459, Cl. 446-268.000.

Lockhart, Ronald R. Chain separator means. 4,686,746, Cl. 24-116.00R.

Lockheed Corporation: *See*—
Kettering, Charles W., 4,687,158, Cl. 244-63.000.

Lockheed Missiles & Space Company, Inc.: *See*—
Bareket, Noah, 4,687,332, Cl. 356-353.000.

Lockwood, James F., to Imperial Underground Sprinkler Co. Ball drive sprinkler. 4,687,139, Cl. 239-205.000.

Lockwood, William D., to Con/Span Culvert Systems, Inc. Precast concrete culvert section. 4,687,371, Cl. 405-125.000.

Loda, Michael A.: *See*—
Peterson, Gregory A.; Loda, Michael A.; and Graff, Timothy E., 4,688,158, Cl. 363-21.000.

Loeb, Gerald E.: *See*—
Byers, Charles L.; Loeb, Gerald E.; Merzenich, Michael M.; and Rebscher, Stephen J., 4,686,765, Cl. 29-858.000.

Logemann, Horst, to Bruggemann & Brand GmbH & Co. KG. Parachute system. 4,687,160, Cl. 244-142.000.

Long, Gary N.: *See*—
Pellet, Regis J.; Best, Donald F.; Long, Gary N.; Rabo, Jule A.; and Wolynic, Edward T., 4,687,754, Cl. 502-65.000.

Long, Marshall. Continuous cooking grill. 4,686,894, Cl. 99-386.000.

Long, William E.: *See*—
Tirel, Malcolm D.; and Long, William E., 4,687,846, Cl. 544-140.000.

Longden, Larry L., to IRT Corporation. Nuclear event detector. 4,687,622, Cl. 376-254.000.

Lonza Ltd.: *See*—
Grayson, James I., 4,687,856, Cl. 546-341.000.

Lopat Industries, Inc.: *See*—
Falk, Charles D.; and Davis, Lincoln R., 4,687,373, Cl. 405-128.000.

Lori Corporation: *See*—
Santii, Robert J.; and Aldieri, Raymond, 4,687,389, Cl. 409-81.000.

Loser, Norbert: *See*—
Kottwitz, Bernd; and Loser, Norbert, 4,687,347, Cl. 384-141.000.

Lottick, Edward A. Anal dilator and occluder. 4,686,985, Cl. 128-344.000.

Lowery, Joyce: *See*—
Ebeling, Donald C., 4,687,945, Cl. 290-37.00R.

Lowery, Loyd: *See*—
Ebeling, Donald C., 4,687,945, Cl. 290-37.00R.

Loy, Fernand R., to Telecommunications Radioelectriques et Telephoniques, TRT. Optical and mechanical scanning device. 4,687,933, Cl. 250-334.000.

Lu, Nicky C.; Ning, Tak H.; and Terman, Lewis M., to International Business Machines Corporation. Dynamic ram cell with MOS trench capacitor in CMOS. 4,688,063, Cl. 357-23.600.

Lucey, Willard J.; and Waugh, Arthur, to BTU Engineering Corporation. Electric furnace heater. 4,687,911, Cl. 219-553.000.

Lukas, Helmut H.; and Pacey, Grant K., to Bell-Northern Research Ltd. Apparatus for aligning an article relative to a datum. 4,687,287, Cl. 350-96.200.

Lush, Linda M.: *See*—
Braun, Hilarion; Lush, Linda M.; and Antolik, Ralph E., III, 4,688,047, Cl. 346-1.100.

Lydall, Inc.: *See*—
Cambo, William H.; Whitely, Elliott F.; and Bond, Leroy E., 4,687,697, Cl. 428-201.000.

Lyytinen, Markku: *See*—
Ilmoniemi, Erkki; Koskimies, Jouni; Lyytinen, Markku; Pitkajarvi, Kari; and Ottelin, Esa, 4,687,548, Cl. 162-216.000.

M/K Systems, Inc.: *See*—
Kallmes, Otto J., 4,687,549, Cl. 162-352.000.

M&T Chemicals Inc.: *See*—
Russell, David B.; Gitlitz, Melvin H.; Leiner, Howard H.; Khuddus, Mo A.; and Berger, Abe, 4,687,792, Cl. 523-177.000.

MacCracken, Calvin D.: *See*—
McLinden, Mark O.; Didion, David A.; and MacCracken, Calvin D., 4,687,588, Cl. 252-67.000.

MacDermid, Incorporated: *See*—
Williams, Ann S.; and Letize, Raymond A., 4,687,545, Cl. 156-651.000.

MacDonald, Scott H.; and MacDonald, William E. Pool cover extending and retracting device. 4,686,717, Cl. 4-502.000.

MacDonald, William E.: *See*—
MacDonald, Scott H.; and MacDonald, William E., 4,686,717, Cl. 4-502.000.

MacDougall, Maurice L.: *See*—
Woollam, Ronald F.; and MacDougall, Maurice L., 4,686,907, Cl. 105-4.100.

Macedo, Pedro B.; Barkatt, Aaron; and Sutter, Herbert G., to Macedo, Pedro B. Method of separating and purifying cations by ion exchange with regenerable porous glass. 4,687,581, Cl. 210-670.000.

MacGinitie, Gordon; and Eames, Thomas R., to Harris Corporation. Centralized image responsive telephone time slot interchange system. 4,688,212, Cl. 370-85.000.

Mack, Gerhard: *See*—
Schlogl, Gunter; Mack, Gerhard; and Michel, Manfred, 4,687,726, Cl. 430-175.000.

Mack, James F. Position incrementer. 4,686,870, Cl. 74-828.000.

Mackey, Larry N.: *See*—
Collins, Jerome H.; Mackey, Larry N.; and Spadini, Gianfranco L., 4,687,592, Cl. 252-99.000.

Maclean, Donald L.; Krishnamurthy, Ramachandran; and Lerner, Steven L., to Boc Group, Inc., The. Argon recovery from hydrogen depleted ammonia plant purge gas utilizing a combination of cryogenic and non-cryogenic separating means. 4,687,498, Cl. 62-17.000.

Maddox, James P., to Imo Delaval Inc. Flow control system for erosive fluids. 4,687,495, Cl. 55-46.000.

Maeda, Hirofumi; Nakamura, Kyoichi; and Fukui, Hisatoshi, to Kanegafuchi Kogaku Kogyo Kabushiki Kaisha. Apparatus for preparing pre-expanded thermoplastic resins. 4,687,641, Cl. 422-133.000.

Maeda, Kensaku; and Mochizuki, Teiichi, to Ebara Corporation. Speed increasing gear for a centrifugal compressor. 4,687,411, Cl. 415-122.00R.

Maekawa, Masanori: *See*—
Kikuchi, Hiroshi; Hayashi, Kuniharu; Isobe, Minoru; Tanuma, Jiro; and Maekawa, Masanori, 4,687,361, Cl. 400-322.000.

Maenosono, Tsukasa: *See*—
Koga, Tadao; Sugimori, Mitsuru; Terasaki, Masanori; Maenosono, Tsukasa; Tsushima, Satoru; Yoshida, Kazuo; Kuriwaki, Tetsusho; and Hirado, Miharu, 4,687,894, Cl. 219-10.430.

Magay, Daniel: *See*—
Toy, Lester T.; and Magay, Daniel, 4,687,280, Cl. 439-874.000.

Magenheim, Bertram; and Rocks, James K., to University Research Foundation. Microwave ice accretion measuring instrument. 4,688,185, Cl. 364-563.000.

Magera, Matthias R. Insulator for water-cooled skid and crossover pipe network. 4,687,027, Cl. 138-149.000.

Maget, Henri J. R.; and Krejci, Paul, to Ivac Corporation. Electrochemically-driven pulsatile drug dispenser. 4,687,423, Cl. 417-379.000.

Magnan, Jeffrey J., to Gaastra Sails International Limited. Flex wing apparatus. 4,686,921, Cl. 114-102.000.

Magous, Richard: *See*—
Martinez, Jean; Bali, Jean-Pierre; Magous, Richard; Castro, Bertrand; and Demarne, Henri, 4,687,759, Cl. 514-18.000.
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Babel, Werner, 4,687,088, Cl. 192-133.000.

Mahr, Josef, to Ford Motor Company. Cover for a motor vehicle spare wheel. 4,687,124, Cl. 224-42.240.

Mair, Steven M.; and Durham, Clyde S., to Mark IV Industries, Inc. Low profile pump jack. 4,686,862, Cl. 74-44.000.

Malaviya, Shashi D.: *See*—
Goth, George R.; and Malaviya, Shashi D., 4,688,073, Cl. 357-56.000.

Malbrancq, Jean-Michel; Bouveret, Elisabeth; and Angleraud, Rene , to Rhone-Poulenc S.A. Membrane apparatus/process adapted for plasmapheresis. 4,687,580, Cl. 210-651.000.

Malcolm, Ronald D., Jr.: *See*—
Beg, Mirza R.; Perl, Julius; and Malcolm, Ronald D., Jr., 4,688,095, Cl. 358-160.000.

Malingowski, Joseph S.: *See*—
Shutterly, Harold B.; and Malingowski, Joseph S., 4,688,260, Cl. 455-601.000.

Mallinckrodt, Inc.: *See*—
Lin, Wayne H. T., 4,687,747, Cl. 436-518.000.

Mallory, Robert L.; Schamel, Alfred H.; and Sekel, Stephen M., to Tektronix, Inc. Packaging for electrical instruments. 4,688,148, Cl. 361-395.000.

Malloy Desormeaux, Stephen G., to Eastman Kodak Company. Film-on-spool sensor for controlling frame counter. 4,687,311, Cl. 354-217.000.

Manara, Giovanni: *See*—
Taramasso, Marco, deceased; Notari, Bruno; Manara, Giovanni; and Bellussi, Giuseppe, 4,687,654, Cl. 423-329.000.

Mannesmann Rexroth GmbH: *See*—
Hartwig, Manfred, 4,687,177, Cl. 251-25.000.

Mannesmann Tally GmbH: *See*—
Puchegger, Karl, 4,686,899, Cl. 101-93.040.

Mansur, Paul G. Container for golf accessories. 4,687,096, Cl. 206-315.900.

MAP Mikrofilm Apparatebau Dr. Poehler GmbH & Co. KG: *See*—
Poehler, Hermann, 4,687,166, Cl. 248-279.000.

Mara, Richard M.: *See*—
Cronson, Harry M.; and Mara, Richard M., 4,688,042, Cl. 342-19.000.

Marathon Oil Company: *See*—
Argabright, Perry A.; and Rhudy, John S., 4,687,586, Cl. 252-8.551.

Marconi Avionics Limited: *See*—
Welsh, John, 4,688,043, Cl. 342-149.000.

Marcus, Paul. Tamper evident container. 4,687,111, Cl. 215-32.000.

Margolien, Daniel J.: *See*—
Prendergast, William M.; and Margolien, Daniel J., 4,686,730, Cl. 15-93.00R.

Margolin, Mark; Moore, James E.; and Grois, Igor, to Allied Corporation. Fiber optic connector with temperature compensating mechanism. 4,687,288, Cl. 350-96.200.

Marinus, Antonius A. M., to U.S. Philips Corporation. Switched-mode power supply having a standby state. 4,688,159, Cl. 363-21.000.

Mark IV Industries, Inc.: *See*—
Mair, Steven M.; and Durham, Clyde S., 4,686,862, Cl. 74-44.000.
Markovic, Radoslav: *See*—
Zils, James A.; and Markovic, Radoslav, 4,686,815, Cl. 53-469.000.
Marksberry, Clarence L., to Electric Power Research Institute, Inc. Thermal storage furnace system. 4,686,959, Cl. 126-400.000.
Markum, T. Randall: *See*—
Cunningham, Donald M.; Bartels, Mark A.; and Markum, T. Randall, 4,687,905, Cl. 219-336.000.
Marley-Wylain Company, The: *See*—
Harbison, Joe A.; Nielsen, Darryl M.; and McDaniel, Dorothy D., 4,687,023, Cl. 137-533.130.
Marr-Leisy, Debra: *See*—
Goodman, Murray; Marr-Leisy, Debra; Rosenkranz, Roberto P.; Melmon, Kenneth L.; and Verlander, Michael S., 4,687,873, Cl. 560-28.000.
Marshall, Garland R.: *See*—
Ali, Fadia E.; Huffman, William F.; Marshall, Garland R.; and Moore, Michael L., 4,687,758, Cl. 514-11.000.
Marshall, James W.; Haaser, Michael J.; Vanicky, Alex A.; and Podhorniak, Gary S., to Advanced Manufacturing Systems, Inc. Vibratory feeder. 4,687,093, Cl. 198-465.200.
marshall, Robert H.: *See*—
Denier, Robert F.; and marshall, Robert H., 4,687,007, Cl. 131-296.000.
Marshall, Stephen E.: *See*—
Buck, Robert H.; Cowan, Kent G.; Doughty, John P.; and Marshall, Stephen E., 4,688,021, Cl. 340-521.000.
Marston, Stephen; and Aboud, Isaac. Sports neck protector. 4,686,710, Cl. 2-2.000.
Martikainen, Kaarlo; and Nevalainen, Kyosti, to Oy Wartsila Ab. Cylinderlock-key-combination. 4,686,843, Cl. 70-366.000.
Martin, Pierre, to Ciba-Geigy Corporation. Microbicidal compositions. 4,687,861, Cl. 548-565.000.
Martin, Roger J.; McKee, William C.; Vader, Scott J.; and Seymour, Frederick C., to Unicell Limited. Manufacture of glass fibre truck bodies. 4,687,428, Cl. 425-60.000.
Martinez, Jean; Bali, Jean-Pierre; Magous, Richard; Castro, Bertrand; and Demarne, Henri, to Sanofi; and Centre National de la Recherche Scientifique (CNRS). Tripeptide and tetrapeptide esters which inhibit gastric secretion, process for their preparation and pharmaceutical compositions in which they are present. 4,687,759, Cl. 514-18.000.
Martinez, Jean; Bali, Jean-Pierre; Magous, Richard; Castro, Bertrand; and Demarne, Henri, to Sanofi; and Centre National de la Recherche Scientifque (CNRS). Reduced peptides which inhibit gastric secretion, process for their preparation and pharmaceutical compositions in which they are present. 4,687,760, Cl. 514-18.000.
Martini, Francesco: *See*—
Vietto, Paolo; and Martini, Francesco, 4,687,711, Cl. 428-515.000.
Martinie, Howard, to Reliance Electric Company. Means for securing a bearing to a shaft. 4,687,351, Cl. 384-541.000.
Maruki, Hirosige, to Murata Kikai Kabushiki Kaisha. Yarn splicing apparatus with a yarn end untwisting device. 4,686,821, Cl. 57-22.000.
Maruyama, Satoshi: *See*—
Kondo, Kazuo; and Maruyama, Satoshi, 4,687,615, Cl. 264-557.000.
Marwick, William F.: *See*—
Daglish, Alan R.; Foster, Mark H.; and Marwick, William F., 4,687,587, Cl. 252-11.000.
Masaru, Uraki. Rotary cleaning device for drain pipe and the like. 4,687,011, Cl. 134-167.00C.
Mason, Douglas L.: *See*—
Galvin, Aaron A.; Mason, Douglas L.; Leff, Kenneth J.; Schide, John N.; and Giffone, Ralph A., 4,687,924, Cl. 250-216.000.
Massachusetts Institute of Technology: *See*—
Sharp, Phillip A.; Capecchi, Mario R.; RajBhandary, Uttam L.; and Laski, Frank A., 4,687,737, Cl. 435-68.000.
Suh, Nam P.; Saka, Nannaji; and Liou, Ming J., 4,687,274, Cl. 439-426.000.
Wurtman, Richard J., 4,687,763, Cl. 514-53.000.
Masse, Norman G.: *See*—
Singhdeo, Narendra N.; Pryor, Michael J.; Leedecke, Charles J.; and Masse, Norman G., 4,687,540, Cl. 156-630.000.
Mast, Karl-Friedrich: *See*—
Betzler, Peter; and Mast, Karl-Friedrich, 4,687,342, Cl. 374-32.000.
Masuda, Katsuya: *See*—
Ikehata, Tsutomu; Masuda, Katsuya; Yasunaga, Makoto; and Michioto, Takao, 4,687,355, Cl. 400-124.000.
Masumoto, Tsuyoshi: *See*—
Nakanouchi, Yukio; Ohnuma, Shigehiro; and Masumoto, Tsuyoshi, 4,688,130, Cl. 360-135.000.
Masuoka, Fujio: *See*—
Ogura, Mitsugi; and Masuoka, Fujio, 4,688,064, Cl. 357-23.600.
Yasuda, Hiroshi; Ochii, Kiyofumi; and Masuoka, Fujio, 4,687,954, Cl. 307-279.000.
Mateika, Werner D.; Laurien, Rolf; and Liehr, Manfred R., to U.S. Philips Corporation. Cold crucible for melting and crystallizing non-metallic inorganic compounds. 4,687,646, Cl. 422-248.000.
Mathias, Anthony D., to Dunlop Olympic Limited. Transport and guide for sewing limp fabric. 4,686,916, Cl. 112-121.120.
Matsubara, Mamoru, to Showa Denko Kabushiki Kaisha. Dehydrating device. 4,686,776, Cl. 34-95.000.
Matsubara, Osamu: *See*—
Takatori, Hiroshi; Suzuki, Toshiro; Matsubara, Osamu; and Yamada, Izuru, 4,687,998, Cl. 328-58.000.
Matsufuji, Akihiro: *See*—
Miyatsuka, Hajime; Kasuga, Akira; Matsufuji, Akihiro; and Kakuta, Takeshi, 4,687,705, Cl. 428-329.000.
Miyoshi, Takahito; Matsufuji, Akihiro; Yamamoto, Nobuyuki; Miyatsuka, Hajime; and Fujiyama, Masaaki, 4,687,704, Cl. 428-328.000.
Matsui, Hirotoshi; Tsumura, Takeo; and Sakanaka, Eiichi, to Sharp Kabushiki Kaisha. Electronic printer with interleaved storage of print wheel position, hammer intensity, and carriage position data in read only memory. 4,687,356, Cl. 400-144.200.
Matsui, Kazuma; Hattori, Yoshiyuki; Imani, Yuichi; Kuno, Akira; and Nomura, Yoshihisa, to Nippondenso Co., Ltd.; and Toyota Jidosha Kabushiki Kaisha. Antiskid control device. 4,687,260, Cl. 303-119.000.
Matsui, Toshikazu; Fushida, Akira; Honda, Nobuyasu; Nakao, Minoru; and Tsuji, Nobuyuki, to Mita Industrial Co., Ltd. Developing device. 4,686,935, Cl. 118-658.000.
Matsumoto, Hideki: *See*—
Katsuragi, Koji; Ozaki, Hirofumi; Kawahara, Yoshihiro; Matsumoto, Hideki; Tomoe, Tetsuro; and Kobayashi, Kazuhiro, 4,687,357, Cl. 400-208.000.
Matsumura, Sueyoshi: *See*—
Nobutoki, Kazuhiro; Ono, Kenji; Okahashi, Keiji; and Matsumura, Sueyoshi, 4,688,010, Cl. 335-128.000.
Matsumura, Susumu: *See*—
Tsunekawa, Tokuichi; Sato, Yuichi; Kawabata, Takashi; and Matsumura, Susumu, 4,687,914, Cl. 250-201.000.
Matsuo, Masashi; Yamagishi, Nobuyuki; Noshiro, Makoto; Jitsugiri, Yukio; and Ohnishi, Keiichi, to Asahi Glass Company Ltd. Low reflectance transparent material having antisoiling properties. 4,687,707, Cl. 428-336.000.
Matsuo, Tamotsu: *See*—
Koishi, Kenji; Matsuo, Tamotsu; and Satoh, Isao, 4,688,203, Cl. 369-48.000.
Matsushita Electric Industrial Co., Ltd.: *See*—
Koishi, Kenji; Matsuo, Tamotsu; and Satoh, Isao, 4,688,203, Cl. 369-48.000.
Mukai, Toshiharu; and Tanaka, Shinichi, 4,688,202, Cl. 369-44.000.
Sugita, Ryuji; Honda, Kazuyoshi; Nishida, Hiroshi; and Noda, Kyoji, 4,687,712, Cl. 428-611.000.
Matsushita Electric Works, Ltd.: *See*—
Fujishima, Nobuichi; Nakano, Hideharu; and Ochi, Shuhei, 4,687,906, Cl. 219-364.000.
Hashimoto, Koichi; Sugai, Haruo; Hara, Hikoyoshi; and Yamada, Norio, 4,686,967, Cl. 128-57.000.
Nobutoki, Kazuhiro; Ono, Kenji; Okahashi, Keiji; and Matsumura, Sueyoshi, 4,688,010, Cl. 335-128.000.
Matsuura, Tooru: *See*—
Tahara, Masato; Matsuura, Tooru; and Ryu, Toshihiko, 4,688,235, Cl. 375-102.000.
Matsuura, Toshitaka: *See*—
Kojima, Takao; Nakano, Akira; Matsuura, Toshitaka; and Takami, Akio, 4,688,015, Cl. 338-34.000.
Matsuyama, Toshiro: *See*—
Ehara, Shaw; Kojima, Yoshimi; Imada, Eiji; Hayakawa, Takashi; and Matsuyama, Toshiro, 4,687,724, Cl. 430-84.000.
Matsuzaka, Takashi; Saito, Toshihiko; and Hisaoka, Satoshi, to Kabushiki Kaisha Toshiba. Pulse combustor. 4,687,435, Cl. 431-1.000.
Matthews, John A.: *See*—
Coburn, Robert E.; and Matthews, John A., 4,686,823, Cl. 60-39.320.
Matthews, Robert: *See*—
Davis, Cecil J.; Matthews, Robert; and Hildenbrand, Randall C., 4,687,542, Cl. 156-643.000.
Mauer, John L., IV: *See*—
Joy, Richard C.; Kemlage, Bernard M.; and Mauer, John L., IV, 4,688,069, Cl. 357-34.000.
Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V.: *See*—
Betzler, Peter; and Mast, Karl-Friedrich, 4,687,342, Cl. 374-32.000.
Mayer, Hans G. Apparatus for performing machining operations in poorly accessible locations. 4,687,386, Cl. 408-88.000.
Mayfield, Windel O. Float valve assembly. 4,687,019, Cl. 137-375.000.
Mayland, Walter: *See*—
Hosemann, Rolf; Mayland, Walter; and Walter, Juergen, 4,688,240, Cl. 378-70.000.
Mays, Joe A.: *See*—
Holmes, Richard E.; Mays, Joe A.; and Tyler, Michael C., 4,687,973, Cl. 315-371.000.
Mazda Motor Corporation: *See*—
Hiraoka, Tetsuo; Hatamura, Koichi; and Yamamoto, Sigeyasu, 4,686,944, Cl. 123-52.0MV.
Miyoshi, Akihiko; and Nakashima, Hitoshi, 4,687,223, Cl. 280-707.000.
Sotoyama, Kaoru; Sumida, Shizuo; and Kikuchi, Toshiyuki, 4,687,083, Cl. 192-0.076.
Mazeau, Jean-Pierre: *See*—
Barlier, Pernette R. M.; and Mazeau, Jean-Pierre, 4,687,751, Cl. 501-32.000.
McBride, Richard A.: *See*—
Kaehler, Kristine M.; Krahe, Ronald P.; Miraldi, Peter T.; and McBride, Richard A., 4,687,635, Cl. 422-26.000.
McCain, G. Howard: *See*—
Jarrett, Robert D.; and McCain, G. Howard, 4,687,808, Cl. 525-54.100.

McCalmon, Miller G.: *See*—
McCauley, Durham S.; and McCalmon, Miller G., 4,686,874, Cl. 81-461.000.
McCarroll, Clark. Lock guard. 4,686,840, Cl. 70-54.000.
McCaskey, John P.: *See*—
Gudaitis, Donald A.; McCaskey, John P.; and Hostetler, Michael S., 4,688,168, Cl. 364-200.000.
McCauley, Durham S.; and McCalmon, Miller G., to McGard, Inc. Tamper-proof bolt and tamper-proof bolt-key combination. 4,686,874, Cl. 81-461.000.
McCormick, Donald M. Geometric construction system and method. 4,686,800, Cl. 52-81.000.
McCoy, David A. Hand tapping device. 4,687,384, Cl. 408-16.000.
McDaniel, Dorothy D.: *See*—
Harbison, Joe A.; Nielsen, Darryl M.; and McDaniel, Dorothy D., 4,687,023, Cl. 137-533.130.
McDermott International Inc.: *See*—
Aghili, Hafez K., 4,687,499, Cl. 62-24.000.
McDonald, Gerald R. Traffic flow indicator for roadway placement. 4,687,369, Cl. 404-12.000.
McDonnell Douglas Corporation: *See*—
Krieg, James C., 4,688,037, Cl. 340-825.720.
McElroy, David J., to Texas Instruments Incorporated. Fuse link for varying chip operating parameters. 4,687,951, Cl. 307-269.000.
McGard, Inc.: *See*—
McCauley, Durham S.; and McCalmon, Miller G., 4,686,874, Cl. 81-461.000.
McGill, Bette L.: *See*—
McGill, Stephen T.; and McGill, Bette L., 4,688,023, Cl. 340-545.000.
McGill, Stephen T.; and McGill, Bette L., to Highsmith, Stephen C. Container having child safety device and alarm. 4,688,023, Cl. 340-545.000.
McGinn, Joseph T.: *See*—
Hoffman, Dorothy M.; Tams, Frederick J., III; and McGinn, Joseph T., 4,687,537, Cl. 156-612.000.
McHale, Edward T.: *See*—
Heaton, Harley L., III; Lippold, Joseph H., Jr.; McHale, Edward T.; and Skolnik, Edward G., 4,687,490, Cl. 44-51.000.
McIntyre, Raymond D.; and Brown, Karl L., to Varian Associates, Inc. In-line beam scanning system. 4,687,936, Cl. 250-397.000.
McKee, William C.: *See*—
Martin, Roger J.; McKee, William C.; Vader, Scott J.; and Seymour, Frederick C., 4,687,428, Cl. 425-60.000.
McKenna, Charles M.: *See*—
Ward, J. William; Bartelt, John L.; Seliger, Robert L.; and McKenna, Charles M., 4,687,940, Cl. 250-492.200.
McKiel, Frank A., Jr., to Rockwell International Corporation. Flame-off limited circuit for wire bonding ball forming apparatus. 4,687,897, Cl. 219-56.210.
McKinney, Gordon R.: *See*—
Gamble, Donald E.; Hunter, Harry L.; and McKinney, Gordon R., 4,687,771, Cl. 514-253.000.
McLean Hospital: *See*—
Neumeyer, John L.; and Baldessarini, Ross J., 4,687,773, Cl. 514-280.000.
McLinden, Mark O.; Didion, David A.; and MacCracken, Calvin D., to Calmac Manufacturing Corporation. Refrigerant mixture of trichlorofluoromethane and dichlorohexafluoropropane. 4,687,588, Cl. 252-67.000.
McMahon, Dennis R.: *See*—
Brown, Ian A.; McMahon, Dennis R.; Rosas, Robin R.; Scopatz, Stephen D.; and Wind, Karen L., 4,687,107, Cl. 209-556.000.
McMath, Jack A., to Dover Corporation. Nozzle having dual hose swivel. 4,687,024, Cl. 137-615.000.
McMillin, John R., to Cornelius Company, The. Method and apparatus for dispensing cold beverage. 4,687,120, Cl. 222-1.000.
McNeil, Kevin B., to Procter & Gamble Company, The. Adjustable sheet length/adjustable sheet count paper rewinder. 4,687,153, Cl. 242-56.800.
McNeilab, Inc.: *See*—
Troutner, Vernon H., 4,687,464, Cl. 604-4.000.
McWhirter, John G., to United Kingdom of Great Britain and Northern Ireland, Secretary of State for Defence in Her Britannic Majesty's Government of the. Constraint application processor for applying a constraint to a set of signals. 4,688,187, Cl. 364-825.000.
Mead Corporation, The: *See*—
Wright, Richard F.; Adair, Paul C.; and Sanders, Frederick W., 4,687,725, Cl. 430-138.000.
Mechanical Products, Inc.: *See*—
Bakhaus, Kenneth C.; and Sdunek, Bruce C., 4,687,164, Cl. 248-27.300.
Meckl, Heinz: *See*—
Reuter, Karl-Heinz; and Meckl, Heinz, 4,687,577, Cl. 210-288.000.
MECRON medizinische Produkte GmbH: *See*—
Brinckmann, Paul; and Anapliotis, Emmanuel, 4,687,486, Cl. 623-16.000.
Media Systems Technology, Inc.: *See*—
Scribner, Richard A.; and Norton, James A., 4,688,124, Cl. 360-99.000.
Mediscan Research Limited: *See*—
Robbins, Adam, 4,686,998, Cl. 128-670.000.
Meek, Jan; and Willemse, Kees, to Heerema Engineering Service BV. Tower structure and methods of fabricating such a structure. 4,687,380, Cl. 405-204.000.
Meek, Robert K.: *See*—
Eagen, Duane M.; and Meek, Robert K., 4,687,018, Cl. 137-340.000.
Meguro, Kanji; and Fujita, Takeshi, to Takeda Chemical Industries, Ltd. Thiazolidinedione derivatives, useful as antidiabetic agents. 4,687,777, Cl. 514-342.000.
Meiji Seika Kaisha, Ltd.: *See*—
Yamamoto, Yuichi; Yoshida, Takashi; Fukatsu, Shunzo; and Ishimaru, Toshiyasu, 4,687,769, Cl. 514-202.000.
Meindl, Bernd, to Konrad Doppelmayr & Sohn Maschinefabrik Gesellschaft m.b.H & Co. KG. Clamping device with test spring deformation measurement. 4,686,906, Cl. 104-209.000.
Meister, John J.; and Patil, Damodar R., to Southern Methodist University. Water soluble graft copolymers of lignin-(2-propenamide)-(sodium 2,2-dimethyl-3-imino-4-oxohex-5-ene-1-sulfonate), methods of making the same and uses therefor. 4,687,828, Cl. 527-400.000.
Melanson, Lionel J.; and Kamal, Nabil, to GTE Products Corporation. Electrically heated insecticide dispenser. 4,687,904, Cl. 219-271.000.
Melcher, Gerhard, to Isovolta Oesterreichische Isolierstoffwerke Aktiengesellschaft. Process for impregnating a planar compressible carrier material with synthetic resin, as well as device for working this process. 4,687,685, Cl. 427-366.000.
Melmon, Kenneth L.: *See*—
Goodman, Murray; Marr-Leisy, Debra; Rosenkranz, Roberto P.; Melmon, Kenneth L.; and Verlander, Michael S., 4,687,873, Cl. 560-28.000.
Memmel, Anton: *See*—
Weber, Robert; and Memmel, Anton, 4,686,794, Cl. 51-59.00R.
Memminger, Gustav; and Roser, Erich, to Memminger, Gustav. Textile yarn pull-off system. 4,687,151, Cl. 242-54.00R.
Menzel, Stanley W. O., to Rib Loc Hong Kong Limited. Method of and means for forming and sealing helically wound tubes. 4,687,690, Cl. 428-36.000.
Mercier, Michel: *See*—
Bernard, Jean; and Mercier, Michel, 4,686,867, Cl. 74-534.600.
Merck Patent Gesellschaft mit beschrankter Haftung: *See*—
Rieke, Erwin; and Kaschek, Renate, 4,687,489, Cl. 8-506.000.
Merlin Gerin: *See*—
Bartolo, William; De Robertis, Patrick; and Vanzetto, Daniel, 4,687,891, Cl. 200-153.00G.
Mermelstein, Marc D., to Geo-Centers, Inc. Fiber optic magnetic field sensing transducer having a resonant structure. 4,687,993, Cl. 324-244.000.
Merzenich, Michael M.: *See*—
Byers, Charles L.; Loeb, Gerald E.; Merzenich, Michael M.; and Rebscher, Stephen J., 4,686,765, Cl. 29-858.000.
Metal Box Public Limited Company: *See*—
Clarke, John; D'Eath, Roderick M.; and Haycock, Derek E., 4,687,612, Cl. 264-322.000.
Metals, Ltd.: *See*—
Lichti, Robert, 4,687,400, Cl. 414-4.000.
Methane Drainage Ventures: *See*—
Richards, Walter L.; Henderson, Roger L.; Aul, George N.; and Pauley, Barry W., 4,687,060, Cl. 166-285.000.
Michael, Norman, to Westinghouse Electric Corp. Zirconium pyrophosphate matrix layer for electrolyte in a fuel cell. 4,687,715, Cl. 429-41.000.
Michel, Jacqueline-Madeleine: *See*—
Hily, Claude E.; and Michel, Jacqueline-Madeleine, 4,687,285, Cl. 350-96.180.
Michel, James C. Toy bouncing ring. 4,687,210, Cl. 273-425.000.
Michel, Manfred: *See*—
Schlogl, Gunter; Mack, Gerhard; and Michel, Manfred, 4,687,726, Cl. 430-175.000.
Michioto, Takao: *See*—
Ikehata, Tsutomu; Masuda, Katsuya; Yasunaga, Makoto; and Michioto, Takao, 4,687,355, Cl. 400-124.000.
Microdot Inc.: *See*—
Berecz, Imre, 4,687,394, Cl. 411-361.000.
Berecz, Imre; and Hinton, Dennis L., 4,687,395, Cl. 411-361.000.
Berecz, Imre, 4,687,396, Cl. 411-503.000.
Berecz, Imre, 4,687,397, Cl. 411-503.000.
Berecz, Imre, 4,687,398, Cl. 411-503.000.
Midwest Plastic Fabricators, Inc.: *See*—
Cross, Andrew L.; and Moran, Thomas F., Jr., 4,687,432, Cl. 425-387.100.
Mieth, Hans O. E., to Otto Tuchenhagen GmbH & Co. KG. Process for the simultaneous cleaning of both seat surfaces of a double seat valve with a product action on at least one side and device to perform the process. 4,687,015, Cl. 137-238.000.
Mikulecky, Harvey W., to RTE Corporation. Removable fuse assembly for pad mounted underground distribution switchgear. 4,688,145, Cl. 361-349.000.
Mildrum, Claude M., to Westinghouse Electric Corp. Fuel rod with annular nuclear fuel pellets having same U-235 enrichment and different annulus sizes for graduated enrichment loading. 4,687,629, Cl. 376-428.000.
Miles Laboratories, Inc.: *See*—
Wang, Joseph Y., 4,687,529, Cl. 156-163.000.
Miliaras, Emmanuel S. Integrated fuel cleaning and power generation. 4,686,832, Cl. 60-676.000.
Miller, David W.: *See*—
Harris, Meade C., Jr.; Miller, David W.; and Arciszewski, Henry E., 4,687,673, Cl. 426-549.000.
Miller, John D.; and Verrando, Marcel G., to Pall Corporation. Sorbing apparatus. 4,687,573, Cl. 210-143.000.

Millross, Christopher R.: *See*—
Folkard, Christopher W.; and Millross, Christopher R., 4,687,728, Cl. 430-270.000.
Mills, Frederick E.: *See*—
Kuchnir, Moyses; and Mills, Frederick E., 4,687,987, Cl. 324-71.300.
Mills, Norman J. Threshold. 4,686,793, Cl. 49-471.000.
Mills, Sharyn A. Adjustable canopy for a wheel chair, beach chair, and the like. 4,687,249, Cl. 297-184.000.
Milner, Ronald E., to Axlon, Inc. Hand-held puppet with pseudo-voice generation. 4,687,457, Cl. 446-175.000.
Milsco Manufacturing Company: *See*—
Esche, John C., 4,687,250, Cl. 297-320.000.
Milwaukee Electric Tool Corporation: *See*—
Palm, Bernhard, 4,687,385, Cl. 408-76.000.
Minaee, Behrooz: *See*—
Chitre, Sanjeev R.; and Minaee, Behrooz, 4,687,895, Cl. 219-10.55A.
Ministerio de Sanidad y Asistencia Social Instituto Venezolano de Investigationes Cientificas: *See*—
O'Daly, Jose A., 4,687,666, Cl. 424-88.000.
Minnesota Mining and Manufacturing Company: *See*—
Cadwell, Donald E.; and Brey, Larry A., 4,687,729, Cl. 430-271.000.
Dufresne, Joel R.; and Dieken, Alan P., 4,686,991, Cl. 128-421.000.
Minolta Camera Kabushiki Kaisha: *See*—
Itoh, Masaaki, 4,687,321, Cl. 355-41.000.
Tanii, Junichi; Yamaki, Toshio; and Seigenji, Kiyoshi, 4,687,266, Cl. 439-77.000.
Mintz, Daniel. Gate lock. 4,687,238, Cl. 292-137.000.
Miraldi, Peter T.: *See*—
Kaehler, Kristine M.; Krahe, Ronald P.; Miraldi, Peter T.; and McBride, Richard A., 4,687,635, Cl. 422-26.000.
Miseo, Sabato: *See*—
Fiato, Rocco A.; Rice, Gary W.; Miseo, Sabato; and Soled, Stuart L., 4,687,753, Cl. 502-5.000.
Mishra, Satchidanand, to Xerox Corporation. Liquid carrier reclaiming apparatus. 4,687,319, Cl. 355-10.000.
Mita Industrial Co., Ltd.: *See*—
Katsuragi, Koji; Ozaki, Hirofumi; Kawahara, Yoshihiro; Matsumoto, Hideki; Tomoe, Tetsuro; and Kobayashi, Kazuhiro, 4,687,357, Cl. 400-208.000.
Matsui, Toshikazu; Fushida, Akira; Honda, Nobuyasu; Nakao, Minoru; and Tsuji, Nobuyuki, 4,686,935, Cl. 118-658.000.
Mitamura, Mitsuru: *See*—
Odasima, Suzuo; Hida, Takao; and Mitamura, Mitsuru, 4,687,333, Cl. 356-382.000.
Mitani, Tetsuo; Baba, Fumiaki; and Iisaka, Katsuyoshi, to Mitsubishi Denki Kabushiki Kaisha. Resin composition. 4,687,801, Cl. 524-104.000.
Mitarai, Akira; and Kubota, Kunio, to Sharp Kabushiki Kaisha. Program modification system in an electronic cash register. 4,688,173, Cl. 364-405.000.
Mitchell, Charles B., to Span America Medical Systems. Mattress cushion with securement feature. 4,686,725, Cl. 5-481.000.
Mitsubishi Denki Kabushiki Kaisha: *See*—
Hayashida, Takahiro, 4,687,978, Cl. 318-599.000.
Hirata, Seiichiro, 4,688,176, Cl. 364-449.000.
Mitani, Tetsuo; Baba, Fumiaki; and Iisaka, Katsuyoshi, 4,687,801, Cl. 524-104.000.
Nishikawa, Akira, 4,688,013, Cl. 337-168.000.
Ochiai, Hajime; and Morihara, Kenji, 4,688,266, Cl. 455-612.000.
Taniguti, Ryosuke; Kohmo, Hidenori; Kubo, Manabu; and Ikeda, Takashi, 4,688,184, Cl. 364-560.000.
Yamamoto, Hiroshi; Suzuki, Hayato; and Takatsuka, Keizo, 4,687,890, Cl. 200-148.00B.
Yamauchi, Takao, 4,688,136, Cl. 361-120.000.
Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
Hashimoto, Kazuyoshi; Nakano, Tsuneo; Arita, Kazutoyo; Fukuyama, Goro; and Shimosato, Yoshio, 4,687,125, Cl. 226-21.000.
Mitsubishi Kinzoku Kabushiki Kaisha: *See*—
Shimomura, Hiroshi; and Arai, Tatsuo, 4,687,383, Cl. 407-46.000.
Mitsubishi Paper Mills, Ltd.: *See*—
Emoto, Kazuhiro; Itoh, Akira; and Haino, Kozo, 4,687,721, Cl. 430-58.000.
Ikeda, Haruhiko; and Hiraishi, Shigetoshi, 4,688,058, Cl. 503-209.000.
Mitsubishi Petrochemical Co., Ltd.: *See*—
Shiraishi, Masao; Nishiya, Yoshinori; and Ito, Syoji, 4,687,804, Cl. 524-505.000.
Mitsubishi Rayon Co., Ltd.: *See*—
Sasaki, Isao; and Mori, Hiroshi, 4,687,811, Cl. 525-100.000.
Mitsui Toatsu Chemicals, Inc.: *See*—
Ibi, Akira; Sato, Takushi; Yamaguchi, Akihiro; Takahashi, Shigeru; Shishido, Shigeyuki; Tamai, Shoji; and Nakajima, Hisai, 4,687,836, Cl. 528-353.000.
Mitsuka, Ikuo; and Kuwabara, Akira, to Dainippon Screen Mfg. Co., Ltd. Method for controlling magnification variation. 4,687,944, Cl. 250-578.000.
Mitsuno, Takashi: *See*—
Suzuki, Migaku; Sasaki, Satoshi; Mitsuno, Takashi; and Inagaki, Hiroyuki, 4,687,477, Cl. 604-385.00A.
Miura, Masami, to NEC Corporation. AM/FM receiver with automatic tuning system. 4,688,264, Cl. 455-168.000.
Miyafuji, Motohisa; Yuchi, Tateo; and Tsuno, Riichi, to Kabushiki Kaisha Kobe Seiko Sho. Lead material for ceramic package IC. 4,687,633, Cl. 420-481.000.
Miyagawa, Hideo: *See*—
Iwamoto, Katsuharu; Kawakami, Osamu; Miyagawa, Hideo; Tashiro, Ikuo; and Ishimura, Takiji, 4,687,927, Cl. 250-231.00P.
Miyajima, Tamotsu; Tanaka, Noriatsu; and Saito, Nobuto, to Pilot Man-Hitsu Kabushiki Kaisha. Erasable ball-point pen ink. 4,687,791, Cl. 523-161.000.
Miyakawa, Tadashi, to Fuji Photo Film Co., Ltd. Method for adjusting density of color picture in color picture output device. 4,687,334, Cl. 356-404.000.
Miyakawa, Tadashi, to Fuji Photo Film Co., Ltd. Method for scanning fiber optic tube. 4,687,974, Cl. 315-375.000.
Miyake, Katsumi: *See*—
Aoki, Shigeo; Ugai, Yasuhiro; Miyake, Katsumi; and Okamoto, Kotaro, 4,687,298, Cl. 350-334.000.
Miyata, Shigeo, to Kyowa Chemical Industry Co., Ltd. Agricultural film structure. 4,686,791, Cl. 47-29.000.
Miyata, Teruo; and Rubin, Albert L., to Optical Corp. Method for manufacturing pyrogen-free collagen gels useful as contact lenses. 4,687,518, Cl. 106-161.000.
Miyatsuka, Hajime; Kasuga, Akira; Matsufuji, Akihiro; and Kakuta, Takeshi, to Fuji Photo Film Co., Ltd. Magnetic recording medium. 4,687,705, Cl. 428-329.000.
Miyatsuka, Hajime: *See*—
Miyoshi, Takahito; Matsufuji, Akihiro; Yamamoto, Nobuyuki; Miyatsuka, Hajime; and Fujiyama, Masaaki, 4,687,704, Cl. 428-328.000.
Miyauchi, Tateoki; Yamaguchi, Hiroshi; Hongo, Mikio; Mizukoshi, Katsuro; Shimase, Akira; and Satoh, Ryohei, to Hitachi, Ltd. Method and apparatus for forming film by ion beam. 4,687,939, Cl. 250-492.200.
Miyoshi, Akihiko; and Nakashima, Hitoshi, to Mazda Motor Corporation. Suspension system for vehicle. 4,687,223, Cl. 280-707.000.
Miyoshi, Takahito; and Fujiyama, Masaaki, to Fuji Photo Film Co., Ltd. Magnetic recording medium. 4,687,703, Cl. 428-323.000.
Miyoshi, Takahito; Matsufuji, Akihiro; Yamamoto, Nobuyuki; Miyatsuka, Hajime; and Fujiyama, Masaaki, to Fuji Photo Film Co., Ltd. Magnetic recording medium. 4,687,704, Cl. 428-328.000.
Miyoshi, Takahito; Okutsu, Toshimitu; and Fujiyama, Masaaki, to Fuji Photo Film Co., Ltd. Magnetic recording medium. 4,687,706, Cl. 428-330.000.
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Miyauchi, Tateoki; Yamaguchi, Hiroshi; Hongo, Mikio; Mizukoshi, Katsuro; Shimase, Akira; and Satoh, Ryohei, 4,687,939, Cl. 250-492.200.
Mizuno, Chiaki: *See*—
Ogawa, Hiroshi; Saito, Shinji; Mizuno, Chiaki; and Tamai, Yasuo, 4,687,710, Cl. 428-447.000.
Mizuta, Yukio: *See*—
Suzuki, Akira; Mizuta, Yukio; Sato, Rejiro; and Shimizu, Kunio, 4,688,156, Cl. 362-354.000.
Moberg, Lennart, to Siemens Aktiengesellschaft. Battery test circuit for a heart pacemaker. 4,686,990, Cl. 128-419.0PT.
Mobil Oil Corporation: *See*—
Hall, Arthur C.; Schultz, E. Frank; and Wiener, Ludwig D., 4,687,523, Cl. 134-30.000.
Owen, Hartley; and Haddad, James H., 4,687,497, Cl. 55-349.000.
Sprunt, Eve S.; Humphreys, Neil V.; Muegge, Ernest L.; and Dixon, James R., Jr., 4,688,238, Cl. 378-4.000.
Uhri, Duane C., 4,687,061, Cl. 166-308.000.
Mobilio, Dominick; Demerson, Christopher A.; and Humber, Leslie G., to American Home Products Corporation. Substituted 2,3,4,9-tetrahydro-1H-carbazole-1-acetic acid. 4,687,860, Cl. 548-439.000.
Mochizuki, Masaaki: *See*—
Hirakata, Kaoru; Mochizuki, Masaaki; Kanai, Hideo; and Itai, Reiichi, 4,687,565, Cl. 204-258.000.
Mochizuki, Teiichi: *See*—
Maeda, Kensaku; and Mochizuki, Teiichi, 4,687,411, Cl. 415-122.00R.
Mod, William A.: *See*—
Ezzell, Bobby R.; Carl, William P.; and Mod, William A., 4,687,821, Cl. 526-247.000.
Modern Home Products Corp.: *See*—
Koziol, Walter, 4,686,957, Cl. 126-41.00R.
Moeller, Charles P., to United States of America, Energy. Method and apparatus for preventing cyclotron breakdown in partially evacuated waveguide. 4,687,616, Cl. 376-123.000.
Moeller, Dieter: *See*—
Lenz, Werner; Sander, Hans; and Moeller, Dieter, 4,687,813, Cl. 525-131.000.
Moeller, Richard E.: *See*—
Brolin, Charles A.; Jennerjohn, Dennis A.; and Moeller, Richard E., 4,687,892, Cl. 219-8.500.
Moffatt, Jeffrey C.: *See*—
Salani, Steven J.; and Moffatt, Jeffrey C., 4,686,880, Cl. 84-1.010.
Monsanto Company: *See*—
Coran, Aubert Y., 4,687,810, Cl. 525-74.000.
Dolan, Michael J.; Rapko, John N.; and Morgenthaler, William W., 4,687,593, Cl. 252-182.000.
Spilburg, Curtis A.; and Moore, William McC., 4,687,841, Cl. 530-331.000.
Stookey, Donald J., 4,687,578, Cl. 210-321.100.

Monsees, John C., to Chemtronics. Structural insulating panel and method of making the panel. 4,687,702, Cl. 428-308.400.

Montedison S.p.A.: *See*—
Cortesi, Paolo; Donati, Gianni; and Saggese, Giuseppe, 4,687,643, Cl. 422-150.000.

Moon, William G.: *See*—
Patzer, John F., II; and Moon, William G., 4,687,569, Cl. 208-407.000.

Moore Business Forms, Inc.: *See*—
Van Malderghem, Edmund G.; and Pennock, Thomas G., 4,687,228, Cl. 282-9.00R.

Moore, Harry C. Pipe bowl filter. 4,687,005, Cl. 131-202.000.

Moore, James E.: *See*—
Margolin, Mark; Moore, James E.; and Grois, Igor, 4,687,288, Cl. 350-96.200.

Moore, Jerry L.: *See*—
Header, Stephen; Moore, Jerry L.; and Taylor, Attalee S., 4,687,267, Cl. 439-62.000.

Moore, John S.; and Ghassemi, Farhad, to Conoco, Inc. Determining steam distribution. 4,687,057, Cl. 166-252.000.

Moore, Michael L.: *See*—
Ali, Fadia E.; Huffman, William F.; Marshall, Garland R.; and Moore, Michael L., 4,687,758, Cl. 514-11.000.

Moore, Ronald D.; Kavanaugh, James D.; Phelps, Richard A.; and Howard, Michael C., to Chivas Products Limited. Padded automotive casket handle. 4,686,741, Cl. 16-112.000.

Moore, William McC.: *See*—
Spilburg, Curtis A.; and Moore, William McC., 4,687,841, Cl. 530-331.000.

Moormann, Alan E.: *See*—
Adelstein, Gilbert W.; Moormann, Alan E.; and Yu, Stella S. T., 4,687,775, Cl. 514-300.000.

Moran, Thomas F., Jr.: *See*—
Cross, Andrew L.; and Moran, Thomas F., Jr., 4,687,432, Cl. 425-387.100.

Morgan, Larry J.: *See*—
Williams, Rodger W.; and Morgan, Larry J., 4,686,980, Cl. 128-303.130.

Morgenthaler, William W.: *See*—
Dolan, Michael J.; Rapko, John N.; and Morgenthaler, William W., 4,687,593, Cl. 252-182.000.

Mori, Akio: *See*—
Saito, Mitsuo; Aikawa, Takeshi; and Mori, Akio, 4,688,032, Cl. 340-799.000.

Mori, Hiroshi: *See*—
Sasaki, Isao; and Mori, Hiroshi, 4,687,811, Cl. 525-100.000.

Mori, Kenji: *See*—
Nakazono, Yutaka; and Mori, Kenji, 4,687,863, Cl. 549-302.000.

Mori, Masaaki: *See*—
Kawakami, Toshio; Mori, Masaaki; and Okada, Chiharu, 4,688,051, Cl. 346-76.0PH.

Mori, Shinji, to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho. Lock mechanism for webbing retractor. 4,687,156, Cl. 242-107.40A.

Mori, Terumi: *See*—
Ito, Makoto; Mori, Terumi; and Takahashi, Hiroyoshi, 4,686,879, Cl. 84-440.000.

Moriai, Yasuharu: *See*—
Inoue, Nori; Moriai, Yasuharu; Sakatani, Atushi; and Yoshida, Noriyuki, 4,688,149, Cl. 361-399.000.

Moridi, Said: *See*—
Desperben, Lydie; Sari, Hikmet; and Moridi, Said, 4,687,999, Cl. 329-109.000.

Morihara, Kenji: *See*—
Ochiai, Hajime; and Morihara, Kenji, 4,688,266, Cl. 455-612.000.

Morii, Hiroaki, to NGK Spark Plug Co., Ltd. Gasket type pressure sensor. 4,686,861, Cl. 73-862.680.

Morita, Tsutomu: *See*—
Shoji, Makoto; Tsuyuguchi, Hiroshi; Toma, Shozo; Hiraki, Kazuhiro; and Morita, Tsutomu, 4,688,112, Cl. 360-60.000.

Moritaka, Junko, Kazuya Moritaka, Takuya Moritaka, heirs: *See*—
Moritaka, Shintaro, deceased; Watanabe, Yasuhiko; and Nishimura, Motoyuki, 4,687,669, Cl. 426-72.000.

Moritaka, Shintaro, deceased (by Moritaka, Junko, Kazuya Moritaka, Takuya Moritaka, heirs); Watanabe, Yasuhiko; and Nishimura, Motoyuki, to Takeda Chemical Industries, Ltd. Process for production of enriched rice or barley. 4,687,669, Cl. 426-72.000.

Moriya, Yoshihito: *See*—
Naruoka, Takao; Moriya, Yoshihito; and Ichimiya, Touru, 4,687,348, Cl. 384-255.000.

Morris, Carla L., legal representative: *See*—
Morris, William J., deceased; Kemmerer, Richard R.; and Christmas, Byron K., 4,687,806, Cl. 524-765.000.

Morris, Dennis; and Goffreda, Frank. Co-extrusion die. 4,687,430, Cl. 425-133.100.

Morris, Gareth W.: *See*—
Comyns, Alan E.; Morris, Gareth W.; and Sankey, John P., 4,687,871, Cl. 556-138.000.

Morris, Robert K., to United States of America, Air Force. Tubular luminescence photovoltaic array. 4,687,880, Cl. 136-246.000.

Morris, William J., deceased (by Morris, Carla L., legal representative); Kemmerer, Richard R.; and Christmas, Byron K., to Interez, Inc. Method of reducing viscosity of radiation curable acrylate functional resin. 4,687,806, Cl. 524-765.000.

Mortensen, Roger L., to Empak, Inc. Wafer processing cassette. 4,687,097, Cl. 206-334.000.

Mortimer, John H., to Inductotherm Corp. Induction furnace packaging system. 4,688,231, Cl. 373-138.000.

Moss, William G.: *See*—
Oloff, Clarence M.; Hermann, Linda M.; Moss, William G.; and Sims, Steven R., 4,686,997, Cl. 128-653.000.

Motegi, Tsutomu; Aoki, Kazuo; and Kimura, Kazuhiro, to Chisso Corporation. Thermoplastic resins containing gloxal heat treated cellulosic fillers. 4,687,793, Cl. 523-200.000.

Motika, Franco; and Waicukauski, John A., to International Business Machines Corporation. Weighted random pattern testing apparatus and method. 4,688,223, Cl. 371-27.000.

Motika, Franco: *See*—
Eichelberger, Edward B.; Langmaid, Roger N.; Lindbloom, Eric; Motika, Franco; Sinchak, John L.; and Waicukauski, John A., 4,687,988, Cl. 324-73.0AT.

Motion Designs, Inc.: *See*—
Okamoto, James, 4,687,218, Cl. 280-242.0WC.

Motoda Electronics Co., Ltd.: *See*—
Motoda, Kenro, 4,687,403, Cl. 414-32.000.

Motoda, Kenro, to Motoda Electronics Co., Ltd. Article delivery apparatus. 4,687,403, Cl. 414-32.000.

Motomak Motorenbau, Maschinen-und Werkzeugfabrik, Konstruktionen GmbH: *See*—
Speil, Walter, 4,686,947, Cl. 123-90.580.

Motomiya, Takehiko, to Ohkura Electric Co., Ltd. Pattern-switching temperature control apparatus. 4,688,180, Cl. 364-477.000.

Motorola Computer Systems, Inc.: *See*—
Schneider, Glenn H., 4,688,166, Cl. 364-200.000.

Motorola, Inc.: *See*—
Adams, Victor J.; and Derrington, Carl E., 4,686,764, Cl. 29-592.000.
Bai, Monty W., 4,686,885, Cl. 89-6.500.
Bauck, Jerald L., 4,687,923, Cl. 250-203.00R.
Chemelewski, Gary, 4,688,265, Cl. 455-223.000.
Ecklund, Lawrence M., 4,688,254, Cl. 381-15.000.
Eitrheim, John K.; and Someshwar, Ashok H., 4,687,959, Cl. 307-465.000.
O'Neil, Vernon P., II, 4,687,957, Cl. 307-311.000.
Peterson, Gregory A.; Loda, Michael A.; and Graff, Timothy E., 4,688,158, Cl. 363-21.000.
Pollard, David R.; and Goldbach, Robert H., 4,688,008, Cl. 333-253.000.
Vaughn, Herchel A., 4,688,018, Cl. 340-347.0AD.

Mousel, Canellen K. Vehicular sunrays-barrier assembly. 4,687,246, Cl. 296-97.00G.

Mozdzen, Edward C.: *See*—
Banasiak, Dennis S.; Mozdzen, Edward C.; and Byers, Jim D., 4,687,867, Cl. 556-52.000.

Muegge, Ernest L.: *See*—
Sprunt, Eve S.; Humphreys, Neil V.; Muegge, Ernest L.; and Dixon, James R., Jr., 4,688,238, Cl. 378-4.000.

Muehlbauer, James H.: *See*—
Stofleth, David F.; and Muehlbauer, James H., 4,687,686, Cl. 427-421.000.

Mukai, Tatsuo: *See*—
Ogibayashi, Shigeaki; Yamada, Mamoru; Mukai, Tatsuo; Tezuka, Makoto; and Hirai, Masazumi, 4,687,047, Cl. 164-476.000.

Mukai, Toshiharu; and Tanaka, Shinichi, to Matsushita Electric Industrial Co., Ltd. Tracking control system for an information reproducing apparatus. 4,688,202, Cl. 369-44.000.

Mukawa, Naoki: *See*—
Nishiwaki, Mitsuo; Amano, Tooru; Yasuda, Tooru; Okubo, Sakae; and Mukawa, Naoki, 4,688,233, Cl. 375-58.000.

Muller, Jacques; and Cassani, Alexandre, to ETA SA Fabriques d'Ebauches. Timer. 4,687,341, Cl. 368-109.000.

Muller, Johannes C. A., to U.S. Philips Corporation. Magnetic tape apparatus with integrated control mechanism. 4,688,120, Cl. 360-85.000.

Mumcu, Salih, to Huls Aktiengelsellschaft. Process for preparing pulverulent coating composition of practically uniform grain sizes and based on polyamide having at least 10 aliphatically bound carbon atoms per carbonamide group. 4,687,837, Cl. 528-496.000.

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Munakata, Megumi: *See*—
Inamoto, Tadayoshi; Noguchi, Hiromichi; and Munakata, Megumi, 4,688,052, Cl. 346-140.00R.
Inamoto, Tadayoshi; Noguchi, Hiromichi; and Munakata, Megumi, 4,688,054, Cl. 346-140.00R.
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Mungovan, John P.: *See*—
Douglas, Robert J.; Doughty, Robert L.; Mungovan, John P.; Andersen, Robert P.; and Abbott, Vaughan, 4,687,502, Cl. 65-164.000.

Munters Corporation, The: *See*—
Hellman, Goran, 4,687,574, Cl. 210-151.000.

Murakami, Yasuhiro: *See*—
Hayashi, Yoshimasa; and Murakami, Yasuhiro, 4,686,942, Cl. 123-41.210.

Murakawa, Shoji, to Toyoda Gosei Co., Ltd. Automatic clip mounting device. 4,686,750, Cl. 29-34.00R.

Murata Kikai Kabushiki Kaisha: *See—*
Maruki, Hirosige, 4,686,821, Cl. 57-22.000.
Sawada, Morio, 4,686,813, Cl. 53-446.000.
Takada, Hiroshi, 4,687,029, Cl. 139-84.000.

Muratake, Kiyoshi: *See—*
Wakabayashi, Tetsushi; Sugimoto, Masahiro; and Muratake, Kiyoshi, 4,688,077, Cl. 357-81.000.

Murayama, Naohiro: *See—*
Teramoto, Yoshikichi; Nakamura, Kenichi; and Murayama, Naohiro, 4,687,803, Cl. 524-413.000.

Murphy, Alan S.: *See—*
Cottrell, Roger L.; and Murphy, Alan S., 4,688,181, Cl. 364-521.000.

Muscat, Peter P. Powered tonneau cover for convertible automobiles. 4,687,247, Cl. 296-136.000.

Muscatell, Ralph P. Flight instrument using light interference for acceleration sensing. 4,686,858, Cl. 73-517.00B.

Mussyln, Eugene F.; and Kelkar, Anand, to Hughes Aircraft Company. Digital cathode current control loop. 4,687,970, Cl. 315-106.000.

Mutoh, Nobuyoshi; Sakai, Keijiro; Suzuki, Toshio; Ueda, Akiteru; Nandoh, Kenji; and Okajima, Ikuo, to Hitachi, Ltd. Rectifier control apparatus with improved power factor. 4,688,162, Cl. 363-80.000.

Muzeroll, Martin E.: *See—*
Lekebusch, Ronald C.; O'Neil, John T., Jr.; and Muzeroll, Martin E., 4,687,453, Cl. 445-4.000.

Myotoku Ltd.: *See—*
Ise, Yoji; Kanno, Teruo; and Yamaguchi, Akira, 4,687,021, Cl. 137-526.000.

Naan Mechanical Works: *See—*
Gorney, Moshe; and Dinur, Eldad, 4,687,143, Cl. 239-542.000.

Naarden International N.V.: *See—*
Van Lier, Franciscus P.; van der Linde, Leendert M.; and van der Weerdt, Antonius J. A., 4,687,599, Cl. 512-27.000.

Nabisco Brands, Inc.: *See—*
Harris, Meade C., Jr.; Miller, David W.; and Arciszewski, Henry E., 4,687,673, Cl. 426-549.000.
Simelunas, William J., 4,687,429, Cl. 425-192.00R.

Nachbur, Hermann, to Ciba-Geigy Corporation. Metal salicylates, process for their preparation and use thereof as color developers in pressure-sensitive or heat-sensitive recording materials. 4,687,869, Cl. 556-132.000.

Nadeau, Paul H., to National Research Development Corporation. Randomly interstratified clays. 4,687,521, Cl. 106-291.000.

Nagai, Yoshitaka; and Doguchi, Nobushige, to Yoshida Kogyo K. K. Method for manufacturing a heat insulating shaped bar. 4,686,754, Cl. 29-418.000.

Nagano, Fumikazu, to Sharp Kabushiki Kaisha. A lighting control device in manuscript reproduction equipment. 4,687,919, Cl. 250-205.000.

Nagao, Kenichi: *See—*
Shiotari, Yoshihisa; and Nagao, Kenichi, 4,688,070, Cl. 357-40.000.

Nagasaki, Tatsuo: *See—*
Yunoki, Yutaka; and Nagasaki, Tatsuo, 4,686,964, Cl. 128-4.000.

Nagasawa, Kenichi: *See—*
Edakubo, Hiroo; and Nagasawa, Kenichi, 4,688,102, Cl. 358-310.000.

Nagata, Osamu; Kajima, Takashi; and Ozaki, Toshiharu, to Technological Research Association of Highly Reliable Marine Propulsion Plant. Electromagnet drive device. 4,688,138, Cl. 361-154.000.

Nagata, Osamu; Kajima, Takashi; and Ozaki, Toshihara, to Technological Research Association of Highly Reliable Marine Propulsion Plant. Electromagnet drive device. 4,688,139, Cl. 361-154.000.

Nagatomo, Masatsugu, to Kabushiki Kaisha Komatsu Seisakusho. Apparatus for operating working element of excavator. 4,686,782, Cl. 37-103.000.

Nagaura, Toru, to Sony Corporation. Organic electrolyte cell. 4,687,716, Cl. 429-145.000.

Naimon, Errol J.; and Jackson, Michael, to Applied Membrane Technology, Inc. Electronic respirable gas delivery device. 4,686,975, Cl. 128-204.230.

Nakagawa, Kenzo; and Suzuki, Masayuki, to Sony Corporation. Device for opening and closing a shutter member of a disk cartridge. 4,688,206, Cl. 369-291.000.

Nakaizumi, Kazuo: *See—*
Inagaki, Yasaburo; and Nakaizumi, Kazuo, 4,688,196, Cl. 365-222.000.

Nakajima, Hisai: *See—*
Ibi, Akira; Sato, Takushi; Yamaguchi, Akihiro; Takahashi, Shigeru; Shishido, Shigeyuki; Tamai, Shoji; and Nakajima, Hisai, 4,687,836, Cl. 528-353.000.

Nakakouji, Hisatada: *See—*
Ogata, Hajime; Nakakouji, Hisatada; Akeda, Yasuhiro; Ichida, Toshio; Irie, Toshio; and Otsuka, Sachiko, 4,687,713, Cl. 428-628.000.

Nakamura, Hideki: *See—*
Ishi, Yuuhei; and Nakamura, Hideki, 4,688,217, Cl. 370-104.000.

Nakamura, Katsunori; Kurano, Akira; Shiroyanagi, Yoshiro; and Kishiro, Shigeru, to Hitachi, Ltd. Error recovery method and apparatus. 4,688,221, Cl. 371-13.000.

Nakamura, Kenichi: *See—*
Teramoto, Yoshikichi; Nakamura, Kenichi; and Murayama, Naohiro, 4,687,803, Cl. 524-413.000.

Nakamura, Kyoichi: *See—*
Maeda, Hirofumi; Nakamura, Kyoichi; and Fukui, Hisatoshi, 4,687,641, Cl. 422-133.000.

Nakamura, Masashi: *See—*
Terayama, Yasunori; Nakamura, Masashi; Fujiie, Kazuhiko; and Yoshitoshi, You, 4,687,296, Cl. 350-247.000.

Nakamura, Osamu: *See—*
Okazaki, Susumu; Higuchi, Shunichi; Nakamura, Osamu; and Takahashi, Sachio, 4,687,996, Cl. 324-436.000.

Nakamura, Shuji: *See—*
Ehara, Shunji; Nakamura, Shuji; and Akama, Masato, 4,687,832, Cl. 528-97.000.

Nakanishi, Yasushi; and Taniguchi, Akihiko, to Sharp Kabushiki Kaisha. Control system for a copier. 4,687,320, Cl. 355-14.00R.

Nakano, Akira: *See—*
Kojima, Takao; Nakano, Akira; Matsuura, Toshitaka; and Takami, Akio, 4,688,015, Cl. 338-34.000.

Nakano, Hideharu: *See—*
Fujishima, Nobuichi; Nakano, Hideharu; and Ochi, Shuhei, 4,687,906, Cl. 219-364.000.

Nakano, Kazuhiko; and Watanabe, Keiichirou, to Sumitomo Chemical Company. Method for the production of endosseous implants. 4,687,675, Cl. 427-2.000.

Nakano, Keiichi: *See—*
Umeda, Tatsutoshi; Tani, Yoshio; Kaai, Takeshi; Nakano, Keiichi; and Izui, Yoshio, 4,686,946, Cl. 123-90.410.

Nakano, Kinichiro: *See—*
Hirano, Motoki; Takeuchi, Mikio; and Nakano, Kinichiro, 4,688,036, Cl. 340-825.690.

Nakano, Shinichi: *See—*
Inagaki, Takashi; and Nakano, Shinichi, 4,686,945, Cl. 123-90.220.

Nakano, Tsuneo: *See—*
Hashimoto, Kazuyoshi; Nakano, Tsuneo; Arita, Kazutoyo; Fukuyama, Goro; and Shimosato, Yoshio, 4,687,125, Cl. 226-21.000.

Nakanouchi, Yukio; Ohnuma, Shigehiro; and Masumoto, Tsuyoshi, to Research Development Corporation of Japan, a part interest. Perpendicular magnetic recording medium and production process thereof. 4,688,130, Cl. 360-135.000.

Nakao, Minoru: *See—*
Matsui, Toshikazu; Fushida, Akira; Honda, Nobuyasu; Nakao, Minoru; and Tsuji, Nobuyuki, 4,686,935, Cl. 118-658.000.

Nakashima, Hitoshi: *See—*
Miyoshi, Akihiko; and Nakashima, Hitoshi, 4,687,223, Cl. 280-707.000.

Nakatsuka, Iwao; Shimizu, Hiroshi; and Yoshitake, Akira, to Sumitomo Chemical Company, Limited. Radioactive iodospiroperidol. 4,687,852, Cl. 546-20.000.

Nakayama, Nobuyoshi: *See—*
Ozu, Tadahiro; Nakayama, Nobuyoshi; and Fujii, Tatsuo, 4,687,136, Cl. 239-8.00X.

Nakazono, Yutaka; and Mori, Kenji, to Nitto Electric Industrial Co., Ltd. Optically active hydroxyiodolactone. 4,687,863, Cl. 549-302.000.

Nalco Chemical Company: *See—*
Wetegrove, Robert L.; and Kaesler, Ralph W., 4,687,807, Cl. 524-827.000.

Nanbu, Morio: *See—*
Obitsu, Takeo; Igaki, Tetsuo; Kinoshita, Kimiaki; Nanbu, Morio; and Satoh, Shinichi, 4,687,862, Cl. 549-224.000.

Nandoh, Kenji: *See—*
Mutoh, Nobuyoshi; Sakai, Keijiro; Suzuki, Toshio; Ueda, Akiteru; Nandoh, Kenji; and Okajima, Ikuo, 4,688,162, Cl. 363-80.000.

Napholcz, Johannes: *See—*
Hunold, Klaus; Lipp, Alfred; Reinmuth, Klaus; Arnold, Peter; and Napholcz, Johannes, 4,687,655, Cl. 423-344.000.

Narita, Ryuuho: *See—*
Aoshima, Terutaka; Asahi, Morio; Imai, Masahiro; and Narita, Ryuuho, 4,687,910, Cl. 219-506.000.

Narui, Hiroshi; and Shinohara, Terumi, to Oike Industrial Co., Ltd. Stamping foil. 4,687,680, Cl. 427-38.000.

Naruoka, Takao; Moriya, Yoshihito; and Ichimiya, Touru, to Toyota Jidosha Kabushiki Kaisha. Device for locking/unlocking rotation of an eccentric bearing used in a compression ratio changing mechanism of an internal combustion engine. 4,687,348, Cl. 384-255.000.

Nash, John. Spiral wire bearing for rotating wire drive catheter. 4,686,982, Cl. 128-305.000.

National Air Sander, Inc.: *See—*
Hoffman, Roger T., 4,686,797, Cl. 51-170.0TL.

National Business Systems, Inc.: *See—*
LaManna, Richard J.; Hinton, James L.; and Cucksey, Edward L., 4,686,898, Cl. 101-18.000.

National Research Development Corporation: *See—*
Cope, Richard E.; and Stirling, Hugh G., 4,687,065, Cl. 172-167.000.
Nadeau, Paul H., 4,687,521, Cl. 106-291.000.

National Semiconductor Corporation: *See—*
Chia, Chok J., 4,688,152, Cl. 361-408.000.

National Starch and Chemical Corporation: *See—*
Kamikaseda, Takeshi; and Yamamoto, Makoto, 4,687,809, Cl. 525-57.000.
Trzasko, Peter T.; Tessler, Martin M.; Trksak, Ralph; and Jarowenko, Wadym, 4,687,519, Cl. 106-211.000.

Navarro, Felipe, to Panavision, Inc. Matte box assembly. 4,687,312, Cl. 354-295.000.

Navarro, Jean-Marie: *See*—
Ghommidh, Charles; Navarro, Jean-Marie; Girardon, Philippe; and Amen, Jean, 4,687,668, Cl. 426-17.000.

Navistar International Corporation: *See*—
Selzer, Robert J., 4,687,224, Cl. 280-718.000.

NCR Corporation: *See*—
Ferrante, Ronald A., 4,687,282, Cl. 350-3.700.

Nealen, Kathleen A.: *See*—
Connelly, Roland L.; Willis, Robert F.; Phelan, Jeremy D.; and Nealen, Kathleen A., 4,688,178, Cl. 364-470.000.

NEC Corporation: *See*—
Inagaki, Yasaburo; and Nakaizumi, Kazuo, 4,688,196, Cl. 365-222.000.
Ishi, Yuuhei; and Nakamura, Hideki, 4,688,217, Cl. 370-104.000.
Miura, Masami, 4,688,264, Cl. 455-168.000.
Nishiwaki, Mitsuo; Amano, Tooru; Yasuda, Tooru; Okubo, Sakae; and Mukawa, Naoki, 4,688,233, Cl. 375-58.000.
Saburi, Akio, 4,688,216, Cl. 370-104.000.
Sangu, Isao, 4,688,109, Cl. 360-10.200.
Tahara, Masato; Matsuura, Tooru; and Ryu, Toshihiko, 4,688,235, Cl. 375-102.000.
Uematsu, Ryosuke; Ushioda, Toyoji; and Fukuchi, Hiromichi, 4,688,048, Cl. 346-1.100.
Yasunaga, Satoshi, 4,688,256, Cl. 381-46.000.
Yoshimoto, Makoto, 4,688,207, Cl. 370-13.000.

Nehen, Ulrich: *See*—
Runzheimer, Hans-volker; Nehen, Ulrich; and Jabs, Gert, 4,687,853, Cl. 546-121.000.

Nelson, Richard V.; and Stephen, John F., to ICI Americas Inc. Tartrate-based light stabilizers for plastics. 4,687,800, Cl. 524-103.000.

Nestec S.A.: *See*—
Akesson, Yngve R., 4,687,674, Cl. 426-549.000.

Neumann, Gerhard: *See*—
Ramisch, Hans; and Neumann, Gerhard, 4,687,275, Cl. 439-404.000.

Neumeyer, John L.; and Baldessarini, Ross J., to McLean Hospital; and Northeastern University. (+)-N-N-propylnorapomorphine and selective limbic activity. 4,687,773, Cl. 514-280.000.

Neumeyer, Martin J.: *See*—
Sanborn, Steven L.; and Neumeyer, Martin J., 4,686,888, Cl. 89-37.130.

Nevalainen, Kyosti: *See*—
Martikainen, Kaarlo; and Nevalainen, Kyosti, 4,686,843, Cl. 70-366.000.

Nevgod, Vasily A.; Garda, Alexandr P.; and Kadyrov, Valery K., to Institut Problem Materialovedenia Akademii Nauk Ukrainskoi SSR. Detonation-gas apparatus for applying coatings. 4,687,135, Cl. 239-81.000.

New Cosmos Electric Co., Ltd.: *See*—
Kitaguchi, Hisao, 4,688,014, Cl. 338-34.000.

New Earth Games: *See*—
Cordry, Christopher D.; and Weeks, Stephen T., 4,687,206, Cl. 273-262.000.

New Jersey Machine, Inc.: *See*—
Voltmer, Helmut, 4,687,535, Cl. 156-361.000.

Newell, Kathryn H. Covered hammock. 4,686,720, Cl. 5-121.000.

Newman, Goeffrey R.; Jasani, Bharat; and Williams, Edward D., to University of Wales College of Medicine, The. Detection of biological substances by specific labelling techniques. 4,687,736, Cl. 435-7.000.

Newman, Leon A.; and DeMaria, Anthony J., to United Technologies Corporation. Phase locked dielectric ridge gas laser. 4,688,228, Cl. 372-18.000.

Newmark, Larry J.; and Hibbert, David A., to General Electric Company. Molded plastic enclosure for electric service apparatus. 4,688,146, Cl. 361-364.000.

Newsome, R. Wayne. Structurally reinforced, pre-fabricated and modular chimney facade system. 4,686,807, Cl. 52-314.000.

Newsome, Reginald W.: *See*—
Houck, Willie G., Jr.; Sprinkel, Francis M., Jr.; Newsome, Reginald W.; Spruill, David B.; and Nichols, Walter A., 4,687,008, Cl. 131-335.000.

Newton, Alan R. Vehicle stabilizer. 4,687,225, Cl. 280-758.000.

ngk Insulators, Ltd.: *See*—
Kajihara, Takehiro; Atsumi, Senji; and Izumiya, Hirotsugu, 4,687,969, Cl. 313-625.000.
Ozaki, Sei; Futamura, Shoji; Kojima, Masaru; and Inoue, Satoru, 4,687,433, Cl. 425-464.000.

NGK Spark Plug Co., Ltd.: *See*—
Kojima, Takao; Nakano, Akira; Matsuura, Toshitaka; and Takami, Akio, 4,688,015, Cl. 338-34.000.
Morii, Hiroaki, 4,686,861, Cl. 73-862.680.

Nichols, Walter A., to Philip Morris Incorporated. Adjustable filter cigarette and method of manufacture thereof. 4,687,009, Cl. 131-336.000.

Nichols, Walter A.: *See*—
Houck, Willie G., Jr.; Sprinkel, Francis M., Jr.; Newsome, Reginald W.; Spruil', David B.; and Nichols, Walter A., 4,687,008, Cl. 131-335.000.

Nicolas, Jacques; and Degrande, Gilbert, to Stein Industrie. Method of bending a thick metal tube, and apparatus for implementing the method. 4,686,844, Cl. 72-13.000.

Nielsen, Darryl M.: *See*—
Harbison, Joe A.; Nielsen, Darryl M.; and McDaniel, Dorothy D., 4,687,023, Cl. 137-533.130.

Nielsen, Richard H., to Phillips Petroleum Company. Fluid feed apparatus. 4,687,642, Cl. 422-140.000.

Niigata Engineering Co., Ltd.: *See*—
Takahashi, Susumu, 4,687,016, Cl. 137-240.000.

Niksa, Marilyn J.: *See*—
Solomon, Frank; Grun, Charles; Abrahamson, Donald W.; Stewart, James J.; and Niksa, Marilyn J., 4,687,553, Cl. 204-16.000.

Nilssen, Ole K. Track lighting system with plug-in adapters. 4,688,154, Cl. 362-147.000.

Ning, Tak H.: *See*—
Lu, Nicky C.; Ning, Tak H.; and Terman, Lewis M., 4,688,063, Cl. 357-23.600.

Nintendo Co., Ltd.: *See*—
Shirai, Ichiro, 4,687,200, Cl. 273-148.00B.

Nippe, Burkhard: *See*—
Brinkmeyer, Hermann; Hubler, Gerhard; Perrey, Hermann; Nippe, Burkhard; and Kober, Heinrich, 4,687,709, Cl. 428-425.900.

Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Ito, Makoto; Mori, Terumi; and Takahashi, Hiroyoshi, 4,686,879, Cl. 84-440.000.

Nippon Kogaku K. K.: *See*—
Kusaka, Yosuke; and Utagawa, Ken, 4,687,917, Cl. 250-201.000.
Tanimoto, Akikazu; Ishizaka, Shoji; Endo, Yutaka; Suzuki, Hiroyuki; and Yanagihara, Masamitsu, 4,687,322, Cl. 355-55.000.

Nippon Kokan Kabushiki Kaisha: *See*—
Kawai, Chiaki; Ohta, Minoru; and Inaba, Takahisa, 4,686,919, Cl. 114-45.000.

Nippon Paint Company, Ltd.: *See*—
Eguchi, Yoshio; and Yamada, Atsushi, 4,687,822, Cl. 526-265.000.

Nippon Piston Ring Co., Ltd.: *See*—
Urano, Shigeru; and Takeguchi, Shunsuke, 4,687,185, Cl. 266-274.000.

Nippon Seiki Co., Ltd.: *See*—
Hasegawa, Kyohei, 4,687,140, Cl. 239-332.000.

Nippon Steel Corporation: *See*—
Ogibayashi, Shigeaki; Yamada, Mamoru; Mukai, Tatsuo; Tezuka, Makoto; and Hirai, Masazumi, 4,687,047, Cl. 164-476.000.

Nippon Thompson Co., Ltd.: *See*—
Geka, Toshiaki, 4,687,345, Cl. 384-44.000.

Nippondenso Co., Ltd.: *See*—
Itoh, Hiroshi; Suzuki, Yasutoshi; Fukada, Tsuyoshi; Ohmi, Shinya; and Hara, Kunihiko, 4,687,956, Cl. 307-310.000.
Matsui, Kazuma; Hattori, Yoshiyuki; Imani, Yuichi; Kuno, Akira; and Nomura, Yoshihisa, 4,687,260, Cl. 303-119.000.

Nishida, Hiroshi: *See*—
Sugita, Ryuji; Honda, Kazuyoshi; Nishida, Hiroshi; and Noda, Kyoji, 4,687,712, Cl. 428-611.000.

Nishida, Masayuki: *See*—
Fukushima, Tsunekazu; Emoto, Hiroshi; Kagitani, Yoshio; Yokoyama, Kazumasa; Nishida, Masayuki; and Suyama, Tadakazu, 4,687,762, Cl. 514-34.000.

Nishikawa, Akira, to Mitsubishi Denki Kabushiki Kaisha. Switchgear assembly for electrical apparatus. 4,688,013, Cl. 337-168.000.

Nishikawa, Yukitoshi: *See*—
Koishi, Toshio; Tanaka, Isao; Yasumura, Takashi; and Nishikawa, Yukitoshi, 4,687,295, Cl. 350-96.340.

Nishimura, Masakatsu: *See*—
Kuroda, Hiroshi; Nishimura, Tsukasa; Nishimura, Masakatsu; Hashimoto, Taiki; Kanda, Osamu; Nozawa, Shigeru; and Shibata, Kenji, 4,687,649, Cl. 423-242.000.

Nishimura, Motoyuki: *See*—
Moritaka, Shintaro, deceased; Watanabe, Yasuhiko; and Nishimura, Motoyuki, 4,687,669, Cl. 426-72.000.

Nishimura, Tsukasa: *See*—
Kuroda, Hiroshi; Nishimura, Tsukasa; Nishimura, Masakatsu; Hashimoto, Taiki; Kanda, Osamu; Nozawa, Shigeru; and Shibata, Kenji, 4,687,649, Cl. 423-242.000.

Nishiwaki, Mitsuo; Amano, Tooru; Yasuda, Tooru; Okubo, Sakae; and Mukawa, Naoki, to NEC Corporation. Digital data transmitting device for communication paths of restricted and unrestricted transmission characteristics. 4,688,233, Cl. 375-58.000.

Nishiya, Yoshinori: *See*—
Shiraishi, Masao; Nishiya, Yoshinori; and Ito, Syoji, 4,687,804, Cl. 524-505.000.

Niskanen, Jukka: *See*—
Lankinen, Matti; Engdahl, Holger; Kohonen, Raimo; Niskanen, Jukka; and Kosonen, Markku, 4,687,583, Cl. 210-739.000.

Nissan Motor Co., Ltd.: *See*—
Hayashi, Yoshimasa; and Murakami, Yasuhiro, 4,686,942, Cl. 123-41.210.
Hirano, Motoki; Takeuchi, Mikio; and Nakano, Kinichiro, 4,688,036, Cl. 340-825.690.
Uno, Takaaki, 4,687,214, Cl. 280-91.000.

Nitto Boseki Co. Ltd.: *See*—
Harada, Susumu; Shimizu, Kiyoshi; and Ujiie, Masayuki, 4,687,817, Cl. 525-375.000.

Nitto Electric Industrial Co., Ltd.: *See*—
Hayashi, Masahiko; and Iwahori, Hiroshi, 4,687,522, Cl. 134-8.000.
Nakazono, Yutaka; and Mori, Kenji, 4,687,863, Cl. 549-302.000.

Nix, Richard A.: *See*—
Leigh-Monstevens, Keith V.; Wrobleski, David L.; Nix, Richard A.; and Rei, Mark W., 4,687,084, Cl. 192-85.0CA.

Nobel, Reinhard: *See*—
Forster, Ludwig; Franke, Alois; and Nobel, Reinhard, 4,687,566, Cl. 204-279.000.

Noble, Karl-Ludwig: *See—*
Weber, Karl-Arnold; Buysch, Hans-Josef; Noble, Karl-Ludwig; and Traubel, Harro, 4,687,830, Cl. 528-64.000.

Nobutoki, Kazuhiro; Ono, Kenji; Okahashi, Keiji; and Matsumura, Sueyoshi, to Matsushita Electric Works, Ltd. Electromagnetic relay. 4,688,010, Cl. 335-128.000.

Noda, Kyoji: *See—*
Sugita, Ryuji; Honda, Kazuyoshi; Nishida, Hiroshi; and Noda, Kyoji, 4,687,712, Cl. 428-611.000.

Noda, Yasushi; Kitahara, Toshihiro; and Tsuyuguchi, Hiroshi, to Teac Corporation. Information processing apparatus having locking means permitting ready detachment of the magnetic disk drive assembly. 4,688,131, Cl. 360-137.000.

Noguchi, Hiromichi; Inamoto, Tadayoshi; and Munakata, Megumi, to Canon Kabushiki Kaisha. Liquid jet recording head having a layer of a resin composition curable with an active energy ray. 4,688,053, Cl. 346-140.00R.

Noguchi, Hiromichi; Inamoto, Tadayoshi; and Munakata, Megumi, to Canon Kabushiki Kaisha. Liquid jet recording head having a layer of a resin composition curable with an active energy ray. 4,688,055, Cl. 346-140.00R.

Noguchi, Hiromichi; Inamoto, Tadayoshi; and Munakata, Megumi, to Canon Kabushiki Kaisha. Liquid jet recording head having a layer of a resin composition curable with an active energy ray. 4,688,056, Cl. 346-140.00R.

Noguchi, Hiromichi: *See—*
Inamoto, Tadayoshi; Noguchi, Hiromichi; and Munakata, Megumi, 4,688,052, Cl. 346-140.00R.
Inamoto, Tadayoshi; Noguchi, Hiromichi; and Munakata, Megumi, 4,688,054, Cl. 346-140.00R.

Noguchi, Minoru: *See—*
Tanabe, Toshiyuki; and Noguchi, Minoru, 4,688,094, Cl. 358-148.000.

Nojima, Kazuhiko: *See—*
Ogata, Naoya; Sanui, Kohei; Yui, Nobuhiko; Nojima, Kazuhiko; Kataoka, Kazunori; Okano, Teruo; and Sakurai, Yasuhisa, 4,687,831, Cl. 528-64.000.

Nolph, Karl D.: *See—*
Twardowski, Zbylut J.; Nolph, Karl D.; and Khanna, Ramesh, 4,687,471, Cl. 604-175.000.

Nomoto, Reishi; and Ozaki, Yoshiaki. Arrangement of push-button controlled floppy disc device. 4,688,125, Cl. 360-99.000.

Nomura, Yoshihisa: *See—*
Matsui, Kazuma; Hattori, Yoshiyuki; Imani, Yuichi; Kuno, Akira; and Nomura, Yoshihisa, 4,687,260, Cl. 303-119.000.

Nomura, Yukihiro: *See—*
Sugisawa, Ko; Yamamoto, Masanori; Yasuda, Ataushi; Nomura, Yukihiro; and Amano, Toshio, 4,687,739, Cl. 435-69.000.

Nordquist, Andrew L.: *See—*
Ferguson, Patrick E.; and Nordquist, Andrew L., 4,688,009, Cl. 333-252.000.

Nordson Corporation: *See—*
Boger, Bentley J.; and Petrecca, Peter J., 4,687,137, Cl. 239-124.000.

Normalair-Garrett (Holdings) Limited: *See—*
Stevenson, George F., 4,687,013, Cl. 137-7.000.

Northeastern University: *See—*
Neumeyer, John L.; and Baldessarini, Ross J., 4,687,773, Cl. 514-280.000.

Northern Engineering and Plastics Corp.: *See—*
Crisci, Robert E., 4,687,114, Cl. 215-256.000.

Norton, James A.: *See—*
Scribner, Richard A.; and Norton, James A., 4,688,124, Cl. 360-99.000.

Noshiro, Makoto: *See—*
Matsuo, Masashi; Yamagishi, Nobuyuki; Noshiro, Makoto; Jitsugiri, Yukio; and Ohnishi, Keiichi, 4,687,707, Cl. 428-336.000.

Notari, Bruno: *See—*
Taramasso, Marco, deceased; Notari, Bruno; Manara, Giovanni; and Bellussi, Giuseppe, 4,687,654, Cl. 423-329.000.

Novak, Mark F.; Guttag, Karl M.; and Redwine, Donald J., to Texas Instruments Incorporated. Control of data access to memory for improved video system. 4,688,197, Cl. 365-230.000.

Novo Industri A/S: *See—*
Skoet, Georg; and Guertler, Hanne, 4,687,742, Cl. 435-234.000.

Noyes, George I., Jr.; and Shah, Prabodh L., to Storage Technology Partners II. Pulsed optical data detection system. 4,688,204, Cl. 369-59.000.

Nozaki, Kenzie, to Shell Oil Company. Production of 1,7-octadiene from butadiene. 4,687,876, Cl. 585-509.000.

Nozawa, Hidebumi: *See—*
Hiramatsu, Kenichi; Nozawa, Hidebumi; and Yamauchi, Takashi, 4,687,536, Cl. 156-556.000.

Nozawa, Shigeru: *See—*
Kuroda, Hiroshi; Nishimura, Tsukasa; Nishimura, Masakatsu; Hashimoto, Taiki; Kanda, Osamu; Nozawa, Shigeru; and Shibata, Kenji, 4,687,649, Cl. 423-242.000.

NTN-Rulon Industries Co., Ltd.: *See—*
Satoji, Fuminori, 4,687,696, Cl. 428-192.000.

Nu-Steel Engineering Pty. Ltd.: *See—*
O'Driscoll, Bryan E., 4,686,802, Cl. 52-94.000.

Nuckolls, John H.; and Thiessen, Albert R., to United States of America, Energy. Laser-fusion targets for reactors. 4,687,618, Cl. 376-152.000.

Nupro Company: *See—*
Danko, Oliver L.; and Bork, Carl R., Jr., 4,687,017, Cl. 137-315.000.
Simonelli, James K.; and Scheffel, Gary W., 4,687,180, Cl. 251-122.000.
Simonelli, James K.; Scheffel, Gary W.; and Jagielo, Joseph J., 4,687,181, Cl. 251-223.000.

Nurmi, Jarmo; Rundt, Kenneth; and Oikari, Timo, to Wallac Oy. Liquid scintillation counter. 4,687,935, Cl. 250-361.00R.

Nussbaum, Theodore W.: *See—*
Warren, Wayne F.; Nussbaum, Theodore W.; Cox, Percy T.; and Johnson, Donald L., 4,687,995, Cl. 324-341.000.

Nutri-Fuels Systems, Inc.: *See—*
Brantman, Eugene R., 4,687,782, Cl. 514-561.000.

Nuwayser, Elie S., to BIOTEK, Inc. Transdermal drug delivery system. 4,687,481, Cl. 604-897.000.

Oaderi, Saiyed B. A.: *See—*
Dickie, Ray A.; and Oaderi, Saiyed B. A., 4,687,812, Cl. 525-111.000.

Oak Industries Inc.: *See—*
Davidov, Mircho A., 4,688,247, Cl. 380-19.000.

Obbermito, Antonio, to Ovas S.a.s. di A. Obbermito & C. Device adapted to be fixed to crash barrier guard rail. 4,686,785, Cl. 40-606.000.

Obitsu, Takeo; Igaki, Tetsuo; Kinoshita, Kimiaki; Nanbu, Morio; and Satoh, Shinichi, to Shin Nisso Kako Co., Ltd. Fluoran compounds. 4,687,862, Cl. 549-224.000.

O'Brien, Edwin L., to Hughes Aircraft Company. Multiple range interval clutter cancellation circuit. 4,688,044, Cl. 342-160.000.

Ochi, Shuhei: *See—*
Fujishima, Nobuichi; Nakano, Hideharu; and Ochi, Shuhei, 4,687,906, Cl. 219-364.000.

Ochiai, Hajime; and Morihara, Kenji, to Mitsubishi Denki Kabushiki Kaisha. Car data transmission device for optical fibers. 4,688,266, Cl. 455-612.000.

Ochii, Kiyofumi: *See—*
Yasuda, Hiroshi; Ochii, Kiyofumi; and Masuoka, Fujio, 4,687,954, Cl. 307-279.000.

Odaka, Kentaro: *See—*
Fukami, Tadashi; and Odaka, Kentaro, 4,688,225, Cl. 371-37.000.

O'Daly, Jose A., to Ministerio de Sanidad y Asistencia Social Instituto Venezolano de Investigationes Cientificas. Vaccine for Leishmaniasis. 4,687,666, Cl. 424-88.000.

Odasima, Suzuo; Hida, Takao; and Mitamura, Mitsuru, to Toshiba Electronic Systems Co., Ltd.; and Toshiba Machine Co., Ltd. Measuring apparatus for optically measuring the thickness of a water film. 4,687,333, Cl. 356-382.000.

O'Driscoll, Bryan E., to Nu-Steel Engineering Pty. Ltd. Structural member. 4,686,802, Cl. 52-94.000.

Office National d'Etudes et de Recherches Aerospatiales (ONERA): *See—*
Bernard, Alain M.; Canny, Jean-Paul L.; and Touboul, Pierre L., 4,688,141, Cl. 361-233.000.

Ogata, Hajime; Nakakouji, Hisatada; Akeda, Yasuhiro; Ichida, Toshio; Irie, Toshio; and Otsuka, Sachiko, to Kawasaki Steel Corporation. Tin-free steel strips useful in the manufacture of welded cans and process for making. 4,687,713, Cl. 428-628.000.

Ogata, Naoya; Sanui, Kohei; Yui, Nobuhiko; Nojima, Kazuhiko; Kataoka, Kazunori; Okano, Teruo; and Sakura., Yasuhisa, to Research Development Corp. of Japan. Antithrombogenic synthetic elastomer and process of preparation thereof. 4,687,831, Cl. 528-64.000.

Ogawa, Hiroshi; Saito, Shinji; Mizuno, Chiaki; and Tamai, Yasuo, to Fuji Photo Film Co., Ltd. Magnetic recording medium. 4,687,710, Cl. 428-447.000.

Ogawa, Kimio, to Victor Company of Japan, Limited. Tape guide arrangement for helical scan magnetic recording and playback apparatus. 4,688,126, Cl. 360-130.240.

Ogawa, Kyosuke, to Canon Kabushiki Kaisha. Image holder member with overlayer of amorphous Si with H and C. 4,687,722, Cl. 430-59.000.

Ogborne, Laurence N.: *See—*
Hume, Kenneth J., deceased; and Ogborne, Laurence N., 4,686,876, Cl. 83-455.000.

Ogibayashi, Shigeaki; Yamada, Mamoru; Mukai, Tatsuo; Tezuka, Makoto; and Hirai, Masazumi, to Nippon Steel Corporation. Continuous casting method. 4,687,047, Cl. 164-476.000.

O'Grady, William R., to Du Pont de Nemours, E. I., and Company. Agricultural sulfonamide. 4,687,506, Cl. 71-92.000.

Ogura, Ichiro: *See—*
Kaneko, Makoto; Ogura, Ichiro; Asahina, Hiroshi; and Yasuhara, Hiroshi, 4,688,175, Cl. 364-414.000.

Ogura, Masami: *See—*
Shimizu, Yasuo; and Ogura, Masami, 4,687,085, Cl. 192-89.00W.

Ogura, Mitsugi; and Masuoka, Fujio, to Kabushiki Kaisha Toshiba. Dynamic memory cell and method for manufacturing the same. 4,688,064, Cl. 357-23.600.

Ohio State University: *See—*
Trewyn, Ronald W.; and D'Ambrosio, Steven M., 4,687,733, Cl. 435-7.000.

Ohkawa, Tihiro: *See—*
Chan, Vincent S.; Chiu, Shiu-Chu; and Ohkawa, Tihiro, 4,688,227, Cl. 372-2.000.

Ohkura Electric Co., Ltd.: *See—*
Motomiya, Takehiko, 4,688,180, Cl. 364-477.000.
Shimizu, Osamu, 4,688,194, Cl. 364-571.000.

Ohme, Roland: *See—*
Ballschuh, Detlef; Seibt, Horst; Rusche, Jochen; and Ohme, Roland, 4,687,602, Cl. 260-501.120.

Ohmi, Shinya: *See*—
Itoh, Hiroshi; Suzuki, Yasutoshi; Fukada, Tsuyoshi; Ohmi, Shinya; and Hara, Kunihiko, 4,687,956, Cl. 307-310.000.
Ohnishi, Keiichi: *See*—
Matsuo, Masashi; Yamagishi, Nobuyuki; Noshiro, Makoto; Jitsugiri, Yukio; and Ohnishi, Keiichi, 4,687,707, Cl. 428-336.000.
Ohnuma, Shigehiro: *See*—
Nakanouchi, Yukio; Ohnuma, Shigehiro; and Masumoto, Tsuyoshi, 4,688,130, Cl. 360-135.000.
Ohsawa, Toshifumi, to Canon Kabushiki Kaisha. Information read-in device for camera. 4,687,307, Cl. 354-21.000.
Ohshima, Kohichi; Kageyama, Yoshiyuki; Ide, Yukio; Fujimura, Itaru; and Kunita, Masako, to Ricoh Company, Ltd. Electrophotographic photoconductor having a photosensitive layer of amorphous silicon carbonitride. 4,687,723, Cl. 430-65.000.
Ohta, Eiichi: *See*—
Igi, Hisashi; Ohta, Eiichi; Bandai, Yasuhito; and Takagi, Kazuhiko, 4,687,352, Cl. 400-73.000.
Ohta, Masaki: *See*—
Suzuki, Shigeru; Ohta, Masaki; and Takenaka, Kenji, 4,687,419, Cl. 417-222.000.
Ohta, Masataka, to Kabushiki Kaisha Sato. Bar code reading method and apparatus. 4,687,912, Cl. 235-463.000.
Ohta, Minoru: *See*—
Kawai, Chiaki; Ohta, Minoru; and Inaba, Takahisa, 4,686,919, Cl. 114-45.000.
Oikari, Timo: *See*—
Nurmi, Jarmo; Rundt, Kenneth; and Oikari, Timo, 4,687,935, Cl. 250-361.00R.
Oike Industrial Co., Ltd.: *See*—
Narui, Hiroshi; and Shinohara, Terumi, 4,687,680, Cl. 427-38.000.
Oishi, Kengo; and Ono, Tuyoshi, to Fuji Photo Film Co., Ltd. Magnetic recording disk cartridge with locking member. 4,688,127, Cl. 360-132.000.
Okada, Chiharu: *See*—
Kawakami, Toshio; Mori, Masaaki; and Okada, Chiharu, 4,688,051, Cl. 346-76.0PH.
Okada, Kazuo, to Kabushiki Kaisha Universal. Stepping motor. 4,687,981, Cl. 318-696.000.
Okada, Yosuke, to Sherwood Medical Company. Catheter for nasogastric intubation. 4,687,470, Cl. 604-171.000.
Okahashi, Keiji: *See*—
Nobutoki, Kazuhiro; Ono, Kenji; Okahashi, Keiji; and Matsumura, Sueyoshi, 4,688,010, Cl. 335-128.000.
Okajima, Ikuo: *See*—
Mutoh, Nobuyoshi; Sakai, Keijiro; Suzuki, Toshio; Ueda, Akiteru; Nandoh, Kenji; and Okajima, Ikuo, 4,688,162, Cl. 363-80.000.
Okamoto, Akinori; Yamaguchi, Tetsuo; Okamura, Haruki; and Okino, Eizo, to Sumitomo Chemical Company, Limited. Vulcanization accelerator, a means for accelerating vulcanization and an improved rubber product containing said accelerator therein. 4,687,756, Cl. 502-165.000.
Okamoto, James, to Motion Designs, Inc. Wheelchair handrim assembly. 4,687,218, Cl. 280-242.0WC.
Okamoto, Kotaro: *See*—
Aoki, Shigeo; Ugai, Yasuhiro; Miyake, Katsumi; and Okamoto, Kotaro, 4,687,298, Cl. 350-334.000.
Okamoto, Tadashi: *See*—
Yamaoka, Hiromasa; Okamoto, Tadashi; Iwasa, Yuzaburo; and Kimura, Kouichi, 4,688,193, Cl. 364-900.000.
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Okazaki, Hiroshi: *See*—
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Okazaki, Naoto: *See*—
Sato, Toru; Okazaki, Naoto; Hasegawa, Toshihisa; Fujii, Katsumasa; and Takano, Kazukiyo, 4,686,974, Cl. 128-204.230.
Okazaki, Susumu; Higuchi, Shunichi; Nakamura, Osamu; and Takahashi, Sachio, to Agency of Industrial Science & Technology, Ministry of International Trade & Industry. Method and apparatus for measuring remaining charge of galvanic cell. 4,687,996, Cl. 324-436.000.
Oki Electric Industry Co., Ltd.: *See*—
Kikuchi, Hiroshi; Hayashi, Kuniharu; Isobe, Minoru; Tanuma, Jiro; and Maekawa, Masanori, 4,687,361, Cl. 400-322.000.
Okino, Eizo: *See*—
Okamoto, Akinori; Yamaguchi, Tetsuo; Okamura, Haruki; and Okino, Eizo, 4,687,756, Cl. 502-165.000.
Okubo, Sakae: *See*—
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Okura Industrial Co., Ltd.: *See*—
Kondo, Kazuo; and Maruyama, Satoshi, 4,687,615, Cl. 264-557.000.
Okutsu, Toshimitu: *See*—
Miyoshi, Takahito; Okutsu, Toshimitu; and Fujiyama, Masaaki, 4,687,706, Cl. 428-330.000.
Olin Corporation: *See*—
Justice, David D.; and Woodard, Kenneth E., Jr., 4,687,558, Cl. 204-59.00R.
Singhdeo, Narendra N.; Pryor, Michael J.; Leedecke, Charles J.; and Masse, Norman G., 4,687,540, Cl. 156-630.000.
Olivarez, Flavio, Jr.; and Walla, Richard J., to Aluminum Company of America & Delta Refractories, Inc. Furnaces for baking anodes. 4,687,439, Cl. 432-192.000.
Oliver, Michael S.: *See*—
Smith, Richard D.; Oliver, Michael S.; Crouse, Richard D.; and Chia, Weng-Kwen R., 4,687,067, Cl. 175-340.000.
Olney, David I. Trash can dumping apparatus. 4,687,405, Cl. 414-408.000.
Oloff, Clarence M.; Herrmann, Linda M.; Moss, William G.; and Sims, Steven R., to United States of America, Air Force. Skeletal bone remodeling studies using guided trephine sample. 4,686,997, Cl. 128-653.000.
Olsen, C. Eric. Flow control valve for a flexible walled tube. 4,687,176, Cl. 251-9.000.
Olson, Carl: *See*—
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Olszewski, Thomas C., Sr.: *See*—
Goudy, Paul R., Jr.; Weekley, William G.; Dovala, Donald L.; and Olszewski, Thomas C., Sr., 4,687,031, Cl. 141-9.000.
Oltman, John E.; and Sanden, Gerald F., to Rayovac Corporation. Case for metal/air electrochemical cells, and cells and lantern batteries thereof. 4,687,714, Cl. 429-27.000.
Olympus Optical Co., Ltd.: *See*—
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OMI International Corporation: *See*—
Shyu, Jieh-Hwa, 4,687,554, Cl. 204-23.000.
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O'Neil, John T., Jr.: *See*—
Lekebusch, Ronald C.; O'Neil, John T., Jr.; and Muzeroll, Martin E., 4,687,453, Cl. 445-4.000.
O'Neil, Vernon P., II, to Motorola, Inc. Fiber optic transceiver. 4,687,957, Cl. 307-311.000.
Ono, Izumi, to Fujitsu Limited. Cooling device attached to each surface of electronic parts on a printed-wiring board. 4,688,147, Cl. 361-385.000.
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Ono, Tuyoshi: *See*—
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Opower, Hans, to W.C. Heraeus GmbH. Gas laser structure, particularly CO_2 laser. 4,688,229, Cl. 372-87.000.
Optical Corp.: *See*—
Miyata, Teruo; and Rubin, Albert L., 4,687,518, Cl. 106-161.000.
Orbeta, Ferdinand E.: *See*—
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Orfus Limited: *See*—
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Orion Research Inc.: *See*—
Gelo, Mark A.; and Hirshberg, Moshe J., 4,687,500, Cl. 65-36.000.
Osborne, Don. Three-point hitch loader. 4,687,407, Cl. 414-703.000.
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Ostergaard, Tage V., to Knud Erik Westergaard. Device in or for high-pressure cleaning units for heating the water by circulation. 4,687,138, Cl. 239-126.000.
Osterloff, Kurt; and Fuhrer, Gerd, to Zahnradfabrik Friedrichshaffen AG. Locking synchronization for gear shift. 4,687,081, Cl. 192-53.00F.
Osterlund, Erik: *See*—
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Oswald, Alexis A.; Jermasen, Torris G.; Westner, Andrew A.; and Huang, I-Der, to Exxon Research and Engineering Company. Ligand exchange process for producing alkyl diaryl phosphine rhodium carbonyl hydrides. 4,687,866, Cl. 556-18.000.
Oswald, Alexis A.; Jermasen, Torris G.; Westner, Andrew A.; and Huang, I-Der, to Exxon Research and Engineering Company. Selective hydroformylation process using alkyl diaryl phosphine rhodium carbonyl hydride catalysts. 4,687,874, Cl. 568-454.000.
Osypka, Peter. Device for slitting introducers for pacemaker electrodes. 4,687,469, Cl. 604-161.000.
Othen, David G.: *See*—
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O'Toole, Michael P.: *See*—
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Otto Dunkel GmbH Fabrik fur elektrotechnische Gerate: *See*—
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Otto Tuchenhagen GmbH & Co. KG: *See*—
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Ovas S.a.s. di A. Obbermito & C.: *See*—
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Owashi, Hitoaki: *See*—
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Owen, Hartley; and Haddad, James H., to Mobil Oil Corporation. Solids-gas separator. 4,687,497, Cl. 55-349.000.
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Ozaki, Hirofumi: *See*—
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Ozaki, Sei; Futamura, Shoji; Kojima, Masaru; and Inoue, Satoru, to NGK Insulators, Ltd.; and Institute of Technology Precision Electrical Discharge Works. Die for extruding ceramic honeycomb structural bodies. 4,687,433, Cl. 425-464.000.
Ozaki, Toshihara: *See*—
Nagata, Osamu; Kajima, Takashi; and Ozaki, Toshihara, 4,688,139, Cl. 361-154.000.
Ozaki, Toshiharu: *See*—
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Ozawa Concrete Industry Co., Ltd.: *See*—
Suzuki, Osamu; Ishizaki, Kanjiro; and Ozawa, Seiichi, deceased, 4,687,614, Cl. 264-40.100.
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Ozu, Tadahiro; Nakayama, Nobuyoshi; and Fujii, Tatsuo, to Kawasaki Jukogyo Kabushiki Kaisha. Gas injection valve for gas engine. 4,687,136, Cl. 239-8.00X.
PACE, Incorporated: *See*—
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Pacey, Grant K.: *See*—
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Padovan, Giovanni: *See*—
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Paeye, Gerard; and Guiader, Alain, to Jeumont-Schneider Corporation. Thermal energy collector and system including a collector of this kind. 4,686,836, Cl. 62-235.100.
Pagett, Jeffery M., to Australian Transcenders International Pty. Ltd. Invalid's wheelchair and like conveyances. 4,687,068, Cl. 180-8.200.
Pailin, Eric. Topical dressings. 4,687,476, Cl. 604-307.000.
Palaniappan, Rasappa, to PT Components, Inc. Instant reversing circuit. 4,687,982, Cl. 318-763.000.
Paliwal, Muktesh; and Johnson, Walter A., to GTE Products Corporation. Metal matrix composite powders and process for producing same. 4,687,511, Cl. 75-0.50B.
Pall Corporation: *See*—
Miller, John D.; and Verrando, Marcel G., 4,687,573, Cl. 210-143.000.
Palloch, Herbert; and Erndt, Hans, to Frankl & Kirchner GmbH & Co KG. Multiple rotary drive system for a textile-working machine. 4,687,461, Cl. 474-148.000.
Palm, Bernhard, to Milwaukee Electric Tool Corporation. Portable hole cutting power tool. 4,687,385, Cl. 408-76.000.
Palma, Beverly. Combination puzzle, box and hangable puzzle frame. 4,687,202, Cl. 273-157.00R.
Palmer, John: *See*—
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Pals, Jan A.; and Klinkhamer, Arend J., to U.S. Philips Corporation. Method of manufacturing a semiconductor device. 4,686,759, Cl. 437-51.000.
Panavision, Inc.: *See*—
Navarro, Felipe, 4,687,312, Cl. 354-295.000.
Pang, Peter K. T.; and Tenner, Thomas E., Jr., to Texas Tech University Health Sciences Center. Hypotensive active peptides. 4,687,840, Cl. 530-331.000.
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Grumbine, Michael T., 4,686,993, Cl. 128-581.000.
Parallel Industries, Inc.: *See*—
Thorne, Kenneth W., 4,687,908, Cl. 219-400.000.
Pardo, Jacob; and Jensen, William S., to Barry Wright Corporation. Avionic tray gasket assembly. 4,687,127, Cl. 277-12.000.
Parker, John A.; Feldman, Rubin; and Bryant, Robert L., to Thermal Science, Inc. Method for producing ammonium polyphosphate. 4,687,651, Cl. 423-315.000.
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Parrish, Randall E.: *See*—
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Parrott, Stephen L.; Kukes, Simon G.; and Brandes, Karlheinz K., to Phillips Petroleum Company. Hydrofining catalyst composition and process for its preparation. 4,687,757, Cl. 502-220.000.
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Parsons, Dale W., to Telex Computer Products, Inc. Apparatus for calibrating tape drive read system. 4,688,113, Cl. 360-67.000.
Partanen, Paavo; and Soderena, Soini, to Elevator GmbH. Apparatus for angularly displacing a load. 4,687,110, Cl. 212-147.000.
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Passaro, Robert E.; Rogers, Raymond E.; and Griffith, Craig J., to Andros Analyzers Incorporated. Infrared gas analyzer with automatic zero adjustment. 4,687,934, Cl. 250-343.000.
Pastor, Antonio C., to Hughes Aircraft Company. Method for growing single crystals of thermally unstable ferroelectric materials. 4,687,538, Cl. 156-616.00R.
Paterson, Karol E.; and Everett, Nicholas P., to Stauffer Chemical Company. Sunflower regeneration media, method of use and plants regenerated thereon. 4,687,743, Cl. 435-240.490.
Pathak, Prabodh; Salter, Stephen J.; Gonzalez, Jay A.; and Perkins, Thomas K., to Atlantic Richfield Company. Enhanced hydrocarbon recovery process utilizing thermoelastic fracturing. 4,687,059, Cl. 166-271.000.
Patil, Damodar R.: *See*—
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Allain, Raymond J.; Bolduc, Henry P., Jr.; Patterson, Thomas R.; and Ingram, Timothy J., 4,686,902, Cl. 101-424.000.
Patzer, John F., II; and Moon, William G., to Chevron Research Company. Steam stripping process for solids separation in oil shale processing. 4,687,569, Cl. 208-407.000.
Pauley, Barry W.: *See*—
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Pauling, Horst; and Wehrli, Christof, to Hoffmann-La Roche Inc. Monoesters of imidazolidinone dicarboxylic acids. 4,687,859, Cl. 548-321.000.
Paulus, Manfred; and Fromel, Norbert, to Fr. Kammerer GmbH. Heat exchanger panel and manufacturing method thereof. 4,687,053, Cl. 165-133.000.
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Peirce, James G. Outboard motor tilt and trim adaptor apparatus and safety device. 4,687,448, Cl. 440-53.000.
Pelgrom, Marcellinus J. M., to U.S. Philips Corporation. Distribution of a data stream in a series-parallel-series digital arrangement comprising digital units having at least one defective element. 4,688,220, Cl. 371-10.000.
Pellet, Regis J.; Best, Donald F.; Long, Gary N.; Rabo, Jule A.; and Wolynic, Edward T., to Union Carbide Corporation. Catalytic cracking catalysts and process. 4,687,754, Cl. 502-65.000.
Pellin, Michael J.: *See*—
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Penney, James W., to Rockwell International Corporation. Dual deposition single level lift-off process. 4,687,541, Cl. 156-643.000.
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Perri, Joseph A.: *See*—
Labate, Michael D.; and Perri, Joseph A., 4,687,184, Cl. 266-270.000.

Personnat, Jean C. M.: *See*—
Poldervaart, Leendert; Personnat, Jean C. M.; and Quinti, Roland P. O., 4,686,924, Cl. 114-219.000.

Pesa, Frederick A.: *See*—
Currie, Janie K.; Cooper, Arthur J.; and Pesa, Frederick A., 4,687,875, Cl. 585-469.000.

Peter, Emmett B.: *See*—
Scarabino, Mario J.; Peter, Emmett B.; and Rettner, Gerald F., 4,687,193, Cl. 271-184.000.

Peters, Dennis D., to Resco Products, Inc. Medium weight abrasion-resistant castable. 4,687,752, Cl. 501-121.000.

Peters, Gerald W.: *See*—
Dougan, Donald R.; Peters, Gerald W.; and Kish, William C., 4,687,145, Cl. 241-57.000.

Petersen, Jorgen H.: *See*—
Rasmussen, Hilmar O.; Petersen, Jorgen H.; Boe, Ove S.; and Clausen, Peter J. M., 4,687,893, Cl. 219-10.410.

Peterson, Gregory A.; Loda, Michael A.; and Graff, Timothy E., to Motorola, Inc. Flyback power supply. 4,688,158, Cl. 363-21.000.

Peterson, Robert K., to Texas Instruments Incorporated. High pin count chip carrier package. 4,688,150, Cl. 361-403.000.

Petit, Maurice L. J.: *See*—
Lemonier, Michel G.; and Petit, Maurice L. J., 4,687,922, Cl. 250-213.0VT.

Petralia, Salvatore; and Young, H. Gerald, to Regina Co., Inc., The. Vacuum cleaner. 4,686,736, Cl. 15-332.000.

Petrecca, Peter J.: *See*—
Boger, Bentley J.; and Petrecca, Peter J., 4,687,137, Cl. 239-124.000.

Petrie, John A. Retaining rings including orienting slot and hole configurations, and apparatus and method of ring orientation. 4,687,399, Cl. 411-518.000.

Pettingell, Winslow L., to Foam Cutting Engineers, Inc. Apparatus for applying a modifying ingredient to open-celled polyurethane material. 4,686,932, Cl. 118-419.000.

Petty, Dean M.; and Sage, Howard M., to Sola U.S.A. Inc. Optical blank carrier for lathing lenses and process therefor. 4,686,798, Cl. 51-216.0LP.

Peugeot, Richard S., to Ridge, Inc. Microfocus X-ray system. 4,688,241, Cl. 378-137.000.

Pfaff Industriemaschinen GmbH: *See*—
Braun, Oskar, 4,686,917, Cl. 112-311.000.

Pfefferle, Richard A.: *See*—
Koshoffer, John M.; Pfefferle, Richard A.; and Larson, Harold A., 4,686,826, Cl. 60-261.000.

Pfeiffer, Hans-Dieter; Huinink, Heinrich; and Reese, Thorsten, to Continental Gummi-Werke Aktiengesellschaft. Pneumatic vehicle tire. 4,687,037, Cl. 152-209.00R.

Phelan, Jeremy D.: *See*—
Connelly, Roland L.; Willis, Robert F.; Phelan, Jeremy D.; and Nealen, Kathleen A., 4,688,178, Cl. 364-470.000.

Phelps, Richard A.: *See*—
Moore, Ronald D.; Kavanaugh, James D.; Phelps, Richard A.; and Howard, Michael C., 4,686,741, Cl. 16-112.000.

Philapitsch, Anton; Wober, Gunter; Eibl, Johann; and Schwarz, Otto, to Immuno Aktiengesellschaft fur chemisch-medizinische Produkte. Method of inactivating reproducible pathogens. 4,687,664, Cl. 424-85.000.

Philip Morris Incorporated: *See*—
Houck, Willie G., Jr.; Sprinkel, Francis M., Jr.; Newsome, Reginald W.; Spruill, David B.; and Nichols, Walter A., 4,687,008, Cl. 131-335.000.
Nichols, Walter A., 4,687,009, Cl. 131-336.000.

Philips, Norbert J. L.: *See*—
Dijkmans, Eise C.; Raets, Joseph G. G.; and Philips, Norbert J. L., 4,688,001, Cl. 330-273.000.

Phillips, Edward H.; and Johannsmeier, Karl-Heinz, to Eaton Corporation. X-Y addressable workpiece positioner and mask aligner using same. 4,687,980, Cl. 318-640.000.

Phillips Petroleum Company: *See*—
Banasiak, Dennis S.; Mozdzen, Edward C.; and Byers, Jim D., 4,687,867, Cl. 556-52.000.
Kukes, Simon G.; and Parrott, Stephen L., 4,687,568, Cl. 208-251.00H.
Nielsen, Richard H., 4,687,642, Cl. 422-140.000.
Parrott, Stephen L.; Kukes, Simon G.; and Brandes, Karlheinz K., 4,687,757, Cl. 502-220.000.
Porter, Randall A.; and Reed, Larry E., 4,687,567, Cl. 208-48.0AA.
Whiteside, James D., II, 4,687,639, Cl. 422-112.000.

Phillips Plastics Corporation: *See*—
Beglinger, Gregory O., 4,687,434, Cl. 425-556.000.

Phillips, Thomas, to DTS, Inc. Blast suppression device. 4,686,911, Cl. 109-1.00S.

Phy, William S., to Fairchild Semiconductor Corporation. Integrated circuit having a pre-attached conductive mounting media and method of making the same. 4,688,075, Cl. 357-80.000.

Picciotto, Robert; Ramel, Francois; Rousseau, Alain; and Touzin, Philippe, to Electronique CKD. Connector for providing electric connection between a portable electronic device and conductors of a fixed progressing system. 4,687,268, Cl. 439-55.000.

Piche, Roland J.; and Carruthers, John W. Guitar with improved vibrato and tuning adjustment assemblies. 4,686,883, Cl. 84-313.000.

Pickens, Frank D.: *See*—
Harris, Richard J., Jr.; and Pickens, Frank D., 4,687,305, Cl. 350-624.000.

Picker International Inc.: *See*—
Gudaitis, Donald A.; McCaskey, John P.; and Hostetler, Michael S., 4,688,168, Cl. 364-200.000.

Pieper, Helmut; Knauer, Adolf; and Sorg, Helmut, to Sorg GmbH & Co. KG. Glass melting furnace with bottom electrodes. 4,687,504, Cl. 65-326.000.

Pierce, Richard H.: *See*—
Cheney, Richard F.; and Pierce, Richard H., 4,687,510, Cl. 75-0.50B.

Piesik, Edward T., to General Dynamics, Pomona Division. Gas management deflector. 4,686,884, Cl. 89-1.816.

Piller, Horst; and Schilling, Albert, to Carl-Zeiss-Stiftung. Incident illumination apparatus for a microscope. 4,687,304, Cl. 350-526.000.

Pilot Man-Hitsu Kabushiki Kaisha: *See*—
Miyajima, Tamotsu; Tanaka, Noriatsu; and Saito, Nobuto, 4,687,791, Cl. 523-161.000.

Pinckney, Linda R., to Corning Glass Works. Transparent glass-ceramics containing gahnite. 4,687,750, Cl. 501-10.000.

Pinckney Molded Plastics, Inc.: *See*—
Kreeger, Elsmer W., 4,687,100, Cl. 206-403.000.

Pioneer Electronic Corporation: *See*—
Akiyama, Toru, 4,688,103, Cl. 358-326.000.
Hosaka, Sumio, 4,688,107, Cl. 358-342.000.
Kunugi, Yoshiro; Suzuki, Shinichi; and Kato, Masayuki, 4,688,258, Cl. 381-103.000.

Pistor, Helmut H., to United States of America, Army. CAM activated printed circuit board multicircuit electrical switch. 4,687,886, Cl. 200-6.00B.

Pitel, Ira J., to Tork, Inc. Two terminal control switch having a main switch and a saturable current transformer whose primary winding is series connected with the main switch. 4,687,985, Cl. 323-323.000.

Pitkajarvi, Kari: *See*—
Ilmoniemi, Erkki; Koskimies, Jouni; Lyytinen, Markku; Pitkajarvi, Kari; and Ottelin, Esa, 4,687,548, Cl. 162-216.000.

Pitney Bowes Inc.: *See*—
Wellman, Russel E.; and Cuming, Phyllis A., 4,687,360, Cl. 400-241.100.

Pitschi, Franz-Xaver: *See*—
Spinner, Georg; Pitschi, Franz-Xaver; and Linnerbauer, Horst, 4,687,272, Cl. 439-271.000.

Plescia, Carl T.; and Gamble, Donald W., to Ford Aerospace & Communications Corporation. Pointing compensation system for spacecraft instruments. 4,687,161, Cl. 244-171.000.

Plough, Inc.: *See*—
Kingsford, Ted I., 4,687,364, Cl. 401-127.000.

Plummer, William T., to Polaroid Corporation. Spectrally filtered lens producing plural f-numbers with different spectral characteristics. 4,687,926, Cl. 250-226.000.

Plyler, Robert G.; and Garretson, Jay H., to General Motors Corporation. Fuse package. 4,687,270, Cl. 439-350.000.

Podhorniak, Gary S.: *See*—
Marshall, James W.; Haaser, Michael J.; Vanicky, Alex A.; and Podhorniak, Gary S., 4,687,093, Cl. 198-465.200.

Podlipnik, Kalman. Dual thermostat controlled outlets. 4,687,050, Cl. 165-27.000.

Poehler, Hermann, to MAP Mikrofilm Apparatebau Dr. Poehler GmbH & Co. KG. Swivel arm. 4,687,166, Cl. 248-279.000.

Polaroid Corporation: *See*—
Plummer, William T., 4,687,926, Cl. 250-226.000.

Poldervaart, Leendert; Personnat, Jean C. M.; and Quinti, Roland P. O., to Single Buoy Moorings Inc. Fender or similar device for absorbing forces of impact. 4,686,924, Cl. 114-219.000.

Pollard, David R.; and Goldbach, Robert H., to Motorola, Inc. Locking, adjustable waveguide shorting piston. 4,688,008, Cl. 333-253.000.

Polovsky, Stuart B.: *See*—
Smolin, Martin; and Polovsky, Stuart B., 4,687,843, Cl. 536-18.300.

Polytex AG: *See*—
Schell, Ferenc, 4,687,241, Cl. 294-61.000.

Pommier, Daniel: *See*—
Blineau, Joseph; Pommier, Daniel; and Thomas, Claude, 4,688,218, Cl. 370-106.000.

Poorman, Thomas J.; Grissom, David; and Carome, Edward F., to Western Geophysical Company of America. Optical system for detecting acoustic wave energy in a fluid medium. 4,688,200, Cl. 367-149.000.

Porter, Randall A.; and Reed, Larry E., to Phillips Petroleum Company. Antifoulants for thermal cracking processes. 4,687,567, Cl. 208-48.0AA.

Potoczky, Joseph B. Method for centrifugal spray molding of thin-walled structures. 4,687,531, Cl. 156-245.000.

Potts, Lanny L., to Tri-Tech, Inc. Treadmill exerciser. 4,687,195, Cl. 272-69.000.

Pouchard, Fernand. Ventilating duct system. 4,686,891, Cl. 98-36.000.

Powers, Frank: *See*—
Lim, Drahoslav; Jacoby, Stephen; Homick, Richard; and Powers, Frank, 4,687,485, Cl. 623-6.000.

Pozefsky, Mark: *See*—
Gray, James P.; Hansen, Peter J.; Lerner, Michael A.; and Pozefsky, Mark, 4,688,035, Cl. 340-825.520.

PPG Industries, Inc.: *See*—
Reese, Thomas J., 4,687,501, Cl. 65-103.000.

ppm, Inc.: *See*—
Shofner, Frederick M., 4,686,744, Cl. 19-200.000.

Pradel, Claude: *See*—
Quang, Dang V.; Pradel, Claude; Euzen, Jean P.; and Le Page, Jean-Francois, 4,687,656, Cl. 423-361.000.
Pranch, Anatoly S., to Latviisky Gosudarstvenny Universitet Imeni Petra Stuchki. Connector for electrical conductors. 4,687,273, Cl. 439-411.000.
Prario, Aldo, to United Technologies Corporation. Gas turbine engine assembly. 4,687,413, Cl. 415-190.000.
Pratt & Whitney Canada Inc.: *See*—
Chamberlain, Stephen S., 4,687,412, Cl. 415-134.000.
Precision Engineered Systems Inc.: *See*—
Allain, Raymond J.; Bolduc, Henry P., Jr.; Patterson, Thomas R.; and Ingram, Timothy J., 4,686,902, Cl. 101-424.000.
Precision Monolithics, Inc.: *See*—
Butler, James R., 4,687,984, Cl. 323-315.000.
Prendergast, William M.; and Margolien, Daniel J., to Ex-Cell-O Corporation. Semi-automatic armature assembly slot cleaner. 4,686,730, Cl. 15-93.00R.
Pretty, Arthur J. Milling machine head assembly. 4,687,391, Cl. 409-201.000.
Price, Sandra N. Patient gown. 4,686,715, Cl. 2-114.000.
Prince Valve, Inc.: *See*—
Eagen, Duane M.; and Meek, Robert K., 4,687,018, Cl. 137-340.000.
Prindle, Gordon E.; and Kelm, Thomas J., to Ideal Instruments, Inc. Automatic clip or pellet carrier fed pellet implanter apparatus. 4,687,465, Cl. 604-61.000.
Prins, Geert J., to Staat der Nederlanden (Staatsbedrijf der Posterijen, Telegrafie en Telefonie). Letter-mail checking device. 4,687,106, Cl. 209-552.000.
Printronix, Inc.: *See*—
Barrus, Gordon B.; and Emenaker, Leo J., 4,687,359, Cl. 400-218.000.
Process Equipment & Service Co., Inc.: *See*—
Rhodes, James E., 4,686,938, Cl. 122-4.00R.
Procter & Gamble Company, The: *See*—
Benedict, James J.; and Johnson, Karen Y., 4,687,768, Cl. 514-102.000.
Collins, Jerome H.; Mackey, Larry N.; and Spadini, Gianfranco L., 4,687,592, Cl. 252-99.000.
McNeil, Kevin B., 4,687,153, Cl. 242-56.800.
Van Tillburg, Kees J., 4,687,478, Cl. 604-387.000.
Product Innovation Limited: *See*—
Frank, Peter, 4,688,025, Cl. 340-571.000.
Promersberger, Jon, to Condux International, Inc. Load limited swivel connector. 4,687,365, Cl. 403-2.000.
Protech Partnership, The: *See*—
Fogleman, H. Frank; and Parrish, Randall E., 4,686,912, Cl. 109-59.00T.
Pruitt, Duard L., to RCA Corporation. Current fed inverter bridge with conduction overlap and load tuning. 4,688,165, Cl. 363-132.000.
Prunbauer, Kurt; and Csapo, Erich, to EVVA-Werk Spezialerzeugung von Zylinder- und Sicherheitsschlossern Gesellschaft mbH & Co. Kommanditgesellschaft. Rotatable magnetic tumbler and magnetic lock containing same. 4,686,841, Cl. 70-276.000.
Prussas, Herbert, to Siemens Aktiengesellschaft. Protective tube arrangement for a glass fiber. 4,687,290, Cl. 350-96.200.
Pryor, Michael J.: *See*—
Singhdeo, Narendra N.; Pryor, Michael J.; Leedecke, Charles J.; and Masse, Norman G., 4,687,540, Cl. 156-630.000.
PT Components, Inc.: *See*—
Palaniappan, Rasappa, 4,687,982, Cl. 318-763.000.
Puchegger, Karl, to Mannesmann Tally GmbH. Shuttle mounting in matrix line printer. 4,686,899, Cl. 101-93.040.
Pumphrey, John G.; and Shanks, Robert E., to Abbott Laboratories. Measurement of optical density via nephenometry. 4,687,336, Cl. 356-436.000.
Puncoch, Miloslav: *See*—
Johnson, Edward N.; and Puncoch, Miloslav, 4,687,162, Cl. 244-213.000.
Pynckel, Paul C.: *See*—
Dewey, David A.; and Pynckel, Paul C., 4,686,992, Cl. 128-303.100.
Quang, Dang V.; Pradel, Claude; Euzen, Jean P.; and Le Page, Jean-Francois, to Institut Francais du Petrole. Longitudinal reactor for chemical syntheses in gas phase and heterogeneous catalysts. 4,687,656, Cl. 423-361.000.
Quantel Limited: *See*—
Keller, Paul R. N.; Gawley, Robin A.; and Stewart, Ian M., 4,688,106, Cl. 358-342.000.
Quay, Steven C., to Salutar, Inc. Metal chelates of diethylenetriaminepentaacetic acid partial esters for NMR imaging. 4,687,658, Cl. 424-9.000.
Quay, Steven C., to Salutar, Inc. Diamide-DTPA-paramagnetic contrast agents for MR imaging. 4,687,659, Cl. 424-9.000.
Quinn, Clayton B.; and Holub, Fred F., to General Electric Company. Polyterephthalatecarbonate-polyetherimide-polyester blends. 4,687,819, Cl. 525-425.000.
Quinti, Roland P. O.: *See*—
Poldervaart, Leendert; Personnat, Jean C. M.; and Quinti, Roland P. O., 4,686,924, Cl. 114-219.000.
R-Con International, Inc.: *See*—
Edwards, William D., 4,687,233, Cl. 285-55.000.
R. E. P. Industries Inc.: *See*—
Penniman, Richard E., 4,687,229, Cl. 282-29.00B.
R. H. Burton Company: *See*—
Thurston, Marlin O., 4,687,928, Cl. 250-231.0SE.
Rabo, Jule A.: *See*—
Pellet, Regis J.; Best, Donald F.; Long, Gary N.; Rabo, Jule A.; and Wolynic, Edward T., 4,687,754, Cl. 502-65.000.
Rachal, Richard N.: *See*—
Timpson, Alma A., Jr.; and Rachal, Richard N., 4,687,212, Cl. 277-205.000.
Radiometer A/S: *See*—
Eisenhardt, Anne R.; and Hansen, Ole M., 4,687,000, Cl. 128-760.000.
Raets, Joseph G. G.: *See*—
Dijkmans, Eise C.; Raets, Joseph G. G.; and Philips, Norbert J. L., 4,688,001, Cl. 330-273.000.
Raffalski, Karl-Heinz, to Theta Industries, Inc. Deformation dilatometer platens. 4,687,343, Cl. 374-56.000.
Rails Company: *See*—
Burwell, Gar W. N., 4,687,134, Cl. 238-349.000.
Raines, Kenneth, to Burron Medical Inc. Self-contained secondary solution set. 4,687,473, Cl. 604-251.000.
Raj, Kuldip: *See*—
Borduz, Lucian; and Raj, Kuldip, 4,687,596, Cl. 252-510.000.
RajBhandary, Uttam L.: *See*—
Sharp, Phillip A.; Capecchi, Mario R.; RajBhandary, Uttam L.; and Laski, Frank A., 4,687,737, Cl. 435-68.000.
Ralston Purina Company: *See*—
Steinmetz, Alan L.; and Krinski, Thomas L., 4,687,826, Cl. 527-201.000.
Ramel, Francois: *See*—
Picciotto, Robert; Ramel, Francois; Rousseau, Alain; and Touzin, Philippe, 4,687,268, Cl. 439-55.000.
Ramisch, Hans; and Neumann, Gerhard, to Otto Dunkel GmbH Fabrik fur elektrotechnische Gerate. Electrical connector for flat multiconductor cable. 4,687,275, Cl. 439-404.000.
Ramot University Authority for Applied Research and Industrial Development Ltd.: *See*—
Rosenberg, Melvyn; and Weiss, Ervin, 4,687,746, Cl. 435-292.000.
Ramseier, Hans, to Autelca AG. Coin guide having track sections arranged in zig zag form. 4,687,090, Cl. 194-317.000.
Ramshaw, Colin, to Imperial Chemical Industries plc. Separation process utilizing centrifugal rotor. 4,687,585, Cl. 210-787.000.
Ramun, John: *See*—
Ramun, Michael; and Ramun, John, 4,686,767, Cl. 30-134.000.
Ramun, Michael; and Ramun, John, to Allied Gator, Inc. Metal cutting shear for a backhoe. 4,686,767, Cl. 30-134.000.
Randazzo, Matthew J., to Conax Buffalo Corporation. Metal-encased light conductor. 4,687,293, Cl. 350-96.230.
Rao, Vemulapalli D. N.: *See*—
Wade, Wallace R.; and Rao, Vemulapalli D. N., 4,686,827, Cl. 60-286.000.
Rapko, John N.: *See*—
Dolan, Michael J.; Rapko, John N.; and Morgenthaler, William W., 4,687,593, Cl. 252-182.000.
Rasche, Dieter. Lock with pivotable slides. 4,687,236, Cl. 292-16.000.
Raschke, Klaus, to W. Haking Enterprises Limited. Shutter release mechanism for automatic cameras. 4,687,314, Cl. 354-400.000.
Rasmussen, Hilmar O.; Pëtersen, Jorgen H.; Boe, Ove S.; and Clausen, Peter J. M., to Danfoss A/S. Method of soldering a metal electrode to an electrically conductive silicone carbide ceramic element. 4,687,893, Cl. 219-10.410.
Raufast, Charles: *See*—
Dumain, Andre ; and Raufast, Charles, 4,687,381, Cl. 406-52.000.
Ravenna, Paul L.: *See*—
Landry, John M.; and Ravenna, Paul L., 4,687,230, Cl. 283-34.000.
Rawlins, David J. Automatic swimming pool cleaner. 4,686,728, Cl. 15-1.700.
Rawson, Eric G.; and Stewart, Lawrence C., to Xerox Corporation. Bright fiber-free biconically tapered couplers. 4,687,284, Cl. 350-96.160.
Ray, Francis M., to Zenith Electronics Corporation. Proportionally displaced coupled walking beams. 4,687,092, Cl. 198-461.000.
Raychaudhuri, Dipankar, to RCA Corporation. Asynchronous random access communication system with collision resolution based on time of arrival. 4,688,213, Cl. 370-93.000.
Raychem Corporation: *See*—
Toy, Lester T.; and Magay, Daniel, 4,687,280, Cl. 439-874.000.
Rayovac Corporation: *See*—
Oltman, John E.; and Sanden, Gerald F., 4,687,714, Cl. 429-27.000.
Raytheon Company: *See*—
Holz, Michael; and Dorschner, Terry A., 4,687,331, Cl. 356-350.000.
Liles, Barry J., 4,688,062, Cl. 357-22.000.
RB & W Corporation: *See*—
Zils, James A.; and Markovic, Radoslav, 4,686,815, Cl. 53-469.000.
RCA Corporation: *See*—
Campbell, Edward R., III; and Lewis, Henry G., Jr., 4,688,096, Cl. 358-167.000.
Carroll, Charles B.; and Houston, David L., 4,687,966, Cl. 313-440.000.
Corrington, Donald G.; Hawkins, Stephen D.; and Sable, Daniel M., 4,688,250, Cl. 380-23.000.
Elabd, Hammam, 4,688,066, Cl. 357-24.000.
Eron, Murat, 4,687,730, Cl. 430-324.000.
Haferl, Peter E., 4,687,972, Cl. 315-371.000.
Hoffman, Dorothy M.; Tams, Frederick J., III; and McGinn, Joseph T., 4,687,537, Cl. 156-612.000.
Pruitt, Duard L., 4,688,165, Cl. 363-132.000.
Raychaudhuri, Dipankar, 4,688,213, Cl. 370-93.000.

Williams, John C., 4,687,445, Cl. 343-719.000.
Rebscher, Stephen J.: *See*—
Byers, Charles L.; Loeb, Gerald E.; Merzenich, Michael M.; and Rebscher, Stephen J., 4,686,765, Cl. 29-858.000.
Recalde, Carlos E., to Santa Fe International Corporation. Multi-reel operational lines laying vessel. 4,687,376, Cl. 405-168.000.
Redwine, Donald J.: *See*—
Novak, Mark F.; Guttag, Karl M.; and Redwine, Donald J., 4,688,197, Cl. 365-230.000.
Reed, Larry E.: *See*—
Porter, Randall A.; and Reed, Larry E., 4,687,567, Cl. 208-48.0AA.
Rees, Lovat V. C.: *See*—
van der Vleugel, Dominicus J. M.; Hoving, Klaas; Wortel, Theodorus M.; Rosensweig, Ronald E.; and Rees, Lovat V. C., 4,687,878, Cl. 585-820.000.
Reese, Thomas J., to PPG Industries, Inc. Lightweight bending iron heat shields for glass bending molds. 4,687,501, Cl. 65-103.000.
Reese, Thorsten: *See*—
Pfeiffer, Hans-Dieter; Huinink, Heinrich; and Reese, Thorsten, 4,687,037, Cl. 152-209.00R.
Reeve, Randy F., to Calmar, Inc. Tamper evident closure. 4,687,113, Cl. 215-230.000.
Regina Co., Inc., The: *See*—
Petralia, Salvatore; and Young, H. Gerald, 4,686,736, Cl. 15-332.000.
Rehak, Pavel; and Gatti, Emilio, to United States of America, Energy. Carrier transport and collection in fully depleted semiconductors by a combined action of the space charge field and the field due to electrode voltages. 4,688,067, Cl. 357-29.000.
Rei, Mark W.: *See*—
Leigh-Monstevens, Keith V.; Wrobleski, David L.; Nix, Richard A.; and Rei, Mark W., 4,687,084, Cl. 192-85.0CA.
Reinartz, Hans D.; and Steffes, Helmut, to Alfred Toves GmbH. Hydraulic brake system with slip control. 4,687,259, Cl. 303-114.000.
Reinmuth, Klaus: *See*—
Hunold, Klaus; Lipp, Alfred; Reinmuth, Klaus; Arnold, Peter; and Napholcz, Johannes, 4,687,655, Cl. 423-344.000.
Reliance Electric Company: *See*—
Martinie, Howard, 4,687,351, Cl. 384-541.000.
Rempp, Paul: *See*—
Chaumont, Philippe; Beinert, Gerard; Herz, Jean; and Rempp, Paul, 4,687,814, Cl. 525-242.000.
Renaud, Merle A.: *See*—
Haley, Paul F.; Junk, Brian S.; Renaud, Merle A.; and Rentmeester, Paul C., 4,686,834, Cl. 62-209.000.
Rendzio, Joseph J. Pivotable trailer extension. 4,687,219, Cl. 280-414.100.
Renner, Hermann; Kleiss, Karlheinz; and Schlodder, Rainer, to Degussa Aktiengesellschaft. Process for the recovery of noble metals from solutions. 4,687,514, Cl. 75-109.000.
Rentmeester, Paul C.: *See*—
Haley, Paul F.; Junk, Brian S.; Renaud, Merle A.; and Rentmeester, Paul C., 4,686,834, Cl. 62-209.000.
Repligen Corporation: *See*—
Farrell, Roberta L.; Kirk, Thomas K.; and Tien, Ming, 4,687,741, Cl. 435-189.000.
Farrell, Roberta L., 4,687,745, Cl. 435-278.000.
Resco Products, Inc.: *See*—
Peters, Dennis D., 4,687,752, Cl. 501-121.000.
Research Development Corporation of Japan: *See*—
Nakanouchi, Yukio; Ohnuma, Shigehiro; and Masumoto, Tsuyoshi, 4,688,130, Cl. 360-135.000.
Ogata, Naoya; Sanui, Kohei; Yui, Nobuhiko; Nojima, Kazuhiko; Kataoka, Kazunori; Okano, Teruo; and Sakurai, Yasuhisa, 4,687,831, Cl. 528-64.000.
Research Plus, Inc.: *See*—
Brosius, James R.; and Brosius, Ralph C., 4,687,126, Cl. 227-10.000.
Research Technology International: *See*—
Bowen, Howard; Henderson, David; and Olson, Carl, 4,687,943, Cl. 250-570.000.
Restall, James E.; and Hayman, Cecil, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Process for diffusion coating metals. 4,687,684, Cl. 427-248.100.
Rettner, Gerald F.: *See*—
Scarabino, Mario J.; Peter, Emmett B.; and Rettner, Gerald F., 4,687,193, Cl. 271-184.000.
Reuss, James L.: *See*—
Snyder, Leon T.; Scarfone, Frank A.; Reuss, James L.; Campen, George V.; and Yates, George H., 4,686,999, Cl. 128-716.000.
Reuter, Karl-Heinz; and Meckl, Heinz, to Agfa Gevaert Aktiengesellschaft. Container for the purification of liquids. 4,687,577, Cl. 210-288.000.
Revalidatie Institut Muiderpoort: *See*—
Swart, Maarten E., 4,686,722, Cl. 5-453.000.
Rewitzer, Siegfried, to Hoechst Aktiengesellschaft. Process for the automatic insertion of box-shaped bags. 4,687,462, Cl. 493-100.000.
Rheem Manufacturing Company: *See*—
Clark, Keith R., 4,687,118, Cl. 220-444.000.
Rhodes, James E., to Process Equipment & Service Co., Inc. System for heating liquid in a separator. 4,686,938, Cl. 122-4.00R.
Rhodes, John; and Evans, Brian K., to J. B. Tillott Limited. Method of treating functional bowel disorders by the administration of peppermint oil to the intestive. 4,687,667, Cl. 424-195.100.
Rhone-Poulenc S.A.: *See*—
Malbrancq, Jean-Michel; Bouveret, Elisabeth; and Angleraud, Rene , 4,687,580, Cl. 210-651.000.
Rhone-Poulenc Specialites Chimiques: *See*—
Cavezzan, Jacques, 4,687,870, Cl. 556-136.000.
Rhudy, John S.: *See*—
Argabright, Perry A.; and Rhudy, John S., 4,687,586, Cl. 252-8.551.
Rib Loc Hong Kong Limited: *See*—
Menzel, Stanley W. O., 4,687,690, Cl. 428-36.000.
Ricardo Consulting Engineers Plc.: *See*—
Glover, Anthony R.; and Grigg, David W., 4,686,949, Cl. 123-306.000.
Ricciardi, Russell. Automobile maneuvering device. 4,687,070, Cl. 180-74.000.
Rice, Gary W.: *See*—
Fiato, Rocco A.; Rice, Gary W.; Miseo, Sabato; and Soled, Stuart L., 4,687,753, Cl. 502-5.000.
Richard Wolf GmbH: *See*—
Ams, Felix; Bolg, Ulrich; and Wurster, Helmut, 4,688,087, Cl. 358-100.000.
Bonnet, Ludwig; and Hiltebrandt, Siegfried, 4,686,965, Cl. 128-4.000.
Bonnet, Ludwig, 4,686,984, Cl. 128-343.000.
Richards, Walter L.; Henderson, Roger L.; Aul, George N.; and Pauley, Barry W., to Methane Drainage Ventures. Production and grout liner for methane drainage in subterranean boreholes and method. 4,687,060, Cl. 166-285.000.
Ricoh Company, Ltd.: *See*—
Emoto, Masami; and Inuzuka, Hideo, 4,687,916, Cl. 250-201.000.
Kawakami, Toshio; Mori, Masaaki; and Okada, Chiharu, 4,688,051, Cl. 346-76.0PH.
Ohshima, Kohichi; Kageyama, Yoshiyuki; Ide, Yukio; Fujimura, Itaru; and Kunita, Masako, 4,687,723, Cl. 430-65.000.
Riddell, Horace G.: *See*—
Waite, David P.; and Riddell, Horace G., 4,688,170, Cl. 364-200.000.
Ridderstolpe, Carl J. Wheel assembly for traversing obstacles. 4,687,213, Cl. 280-5.260.
Ridge, Inc.: *See*—
Peugeot, Richard S., 4,688,241, Cl. 378-137.000.
Rieke, Erwin; and Kaschek, Renate, to Merck Patent Gesellschaft mit beschrankter Haftung. Stabilizer for biological staining solutions. 4,687,489, Cl. 8-506.000.
Rienzo, Francis B., to GTE Government Systems Corporation. Apparatus for holding workpiece. 4,687,243, Cl. 294-86.400.
Rigby, William R.: *See*—
Furneaux, Robin C.; Rigby, William R.; and Davidson, Alexander P., 4,687,551, Cl. 204-11.000.
Rijkaart, Lodewijk C. Slicing apparatus. 4,686,875, Cl. 83-425.200.
Rilly, Gerard, to Deutsche Thomson-Brandt GmbH. Direct-voltage converter for feeding an appliance with an inductive component. 4,688,164, Cl. 363-98.000.
Ringer, Thomas R., to Canadian Patents and Development Limited. Railway switch control system. 4,687,163, Cl. 246-428.000.
Riordan, Edward D.; and Warner, Allan, to Joyal Products, Inc. Method of fusing wire to a terminal. 4,687,898, Cl. 219-56.220.
Ripani, Sergio; and Serafini, Giulio, to Carle & Montanari S.p.A. Chocolate feeding device for chocolate refiners. 4,688,177, Cl. 364-468.000.
Rischmueller, Klaus, to Thomson-CSF. Switching circuit using a fast diode and provided with means for damping oscillations on opening. 4,688,157, Cl. 363-20.000.
Risthaus, Josef: *See*—
Lemmer, Helmut; and Risthaus, Josef, 4,688,011, Cl. 335-159.000.
Ritz, Paul, to Stein Associates, Inc. Sprinkle belt. 4,686,930, Cl. 118-24.000.
RIV-SKF Officine Di Villar Perosa S.p.A.: *See*—
Bessone, Mario, 4,687,211, Cl. 277-50.000.
Riva, Ermete, to Sobrevin Societe de brevets industriels-Etablissement. Delivery device for continuous threads. 4,687,149, Cl. 242-47.010.
Rivera, Efrain. Push button shift control for bicycles and the like. 4,686,865, Cl. 74-475.000.
Riviera, Paul. Symbol puzzle. 4,687,201, Cl. 273-153.00R.
Rizk, Sidky D.; and Hsieh, Harry W. S., to Essex Specialty Products, Inc. Bonding method employing moisture curable polyurethane polymers. 4,687,533, Cl. 156-307.300.
Rizzo, Gilles: *See*—
Dubertret, Alain; Rizzo, Gilles; Bargain, Raymond; De Mendez, Michel; and Thenaisie, Jacky, 4,687,269, Cl. 439-161.000.
RJM, Inc.: *See*—
Johnson, Reaves, 4,687,064, Cl. 171-27.000.
Robbins, Adam, to Mediscan Research Limited. Patient temperature and heartbeat rate monitoring system. 4,686,998, Cl. 128-670.000.
Robert Bosch GmbH: *See*—
Buck, Rainer; Wessel, Wolf; and Stumpp, Gerhard, 4,686,830, Cl. 60-603.000.
Frister, Manfred, 4,687,960, Cl. 310-42.000.
Hess, Heinz, 4,688,083, Cl. 358-30.000.
Roberts, Clive J.: *See*—
Irwin, Jere F.; Doornink, John R.; and Roberts, Clive J., 4,687,144, Cl. 241-49.000.
Robinton, Michael A., to Robinton Products, Inc. Apparatus and method for producing a signal-to-noise ratio figure of merit for digitally encoded-data. 4,688,234, Cl. 375-10.000.
Robinton Products, Inc.: *See*—
Robinton, Michael A., 4,688,234, Cl. 375-10.000.

Robishaw, Alces P. Method and apparatus for constructing elevated structures. 4,687,379, Cl. 405-195.000.

Rock, Erich; and Rupprechter, Helmut, to Julius Blum Gesellschaft m.b.H. Marking gauge for use in mounting hinges. 4,686,769, Cl. 33-197.000.

Rocks, James K.: *See*—
Magenheim, Bertram; and Rocks, James K., 4,688,185, Cl. 364-563.000.

Rockwell International Corporation: *See*—
McKiel, Frank A., Jr., 4,687,897, Cl. 219-56.210.
Penney, James W., 4,687,541, Cl. 156-643.000.
Sutton, Robert F.; and Kirkham, Kathleen E., 4,687,556, Cl. 204-29.000.

Rodriguez, John G. Tamale making method. 4,687,670, Cl. 426-297.000.

Rogers Corporation: *See*—
Frayer, Paul D., 4,687,968, Cl. 313-509.000.

Rogers, Raymond E.: *See*—
Passaro, Robert E.; Rogers, Raymond E.; and Griffith, Craig J., 4,687,934, Cl. 250-343.000.

Roller, Johannes. Projectile-casting ingot mold. 4,687,045, Cl. 164-262.000.

Roman, Gianfranco; Da Rold, Claudio; and Spadotto, Oliviano, to Claber S.p.A. Washing brush with water supply and rotating bristles especially for motor vehicles. 4,686,729, Cl. 15-29.000.

Romanczuk, Chris S.: *See*—
Zeigler, Thornton W., Jr.; Romanczuk, Chris S.; Betterton, Joseph T.; and Glover, Alfred H., 4,686,952, Cl. 123-572.000.

Romer-Britax Autogurte GmbH: *See*—
Klanner, Wilfried; Schmaler, Dieter H.; Wetter, Hermann; Felsch, Bernhard; and Czernakowski, Waldemar, 4,687,255, Cl. 297-488.000.

Ronco Laboratories, Inc.: *See*—
Baseman, Maurice; and Swift, Harold, 4,687,634, Cl. 422-7.000.

Roos, Aage V., to Santrade Limited. Cutting tool. 4,687,387, Cl. 408-144.000.

Rorig, Kurt J.: *See*—
Djuric, Stevan W.; Chinn, Leland J.; and Rorig, Kurt J., 4,687,864, Cl. 549-414.000.

Rosas, Robin R.: *See*—
Brown, Ian A.; McMahon, Dennis R.; Rosas, Robin R.; Scopatz, Stephen D.; and Wind, Karen L., 4,687,107, Cl. 209-556.000.

Rose, Robert D., Jr. Device for supporting bound material. 4,687,226, Cl. 281-45.000.

Roseliep, Robert E. Flywheel starter gear and method of making. 4,686,864, Cl. 74-431.000.

Rosen, Frank L.: *See*—
Beveventano, Thomas; Rosen, Frank L.; Wolff, Richard H.; and Bendett, Raymond, 4,686,771, Cl. 33-324.000.

Rosenberg, Melvyn; and Weiss, Ervin, to Ramot University Authority for Applied Research and Industrial Development Ltd. Microorganism culture-transfer device. 4,687,746, Cl. 435-292.000.

Rosenfeld, John. Cat box litter and process for producing same. 4,686,937, Cl. 119-1.000.

Rosenkranz, Roberto P.: *See*—
Goodman, Murray; Marr-Leisy, Debra; Rosenkranz, Roberto P.; Melmon, Kenneth L.; and Verlander, Michael S., 4,687,873, Cl. 560-28.000.

Rosensweig, Ronald E.: *See*—
van der Vleugel, Dominicus J. M.; Hoving, Klaas; Wortel, Theodorus M.; Rosensweig, Ronald E.; and Rees, Lovat V. C., 4,687,878, Cl. 585-820.000.

Roser, Erich: *See*—
Memminger, Gustav; and Roser, Erich, 4,687,151, Cl. 242-54.00R.

Rosheim, Mark E. Compact robot wrist acuator. 4,686,866, Cl. 74-479.000.

Rosman, Allan H., to Dynamic Hydraulic Systems, Inc. Hydraulically operated clamshell device. 4,686,828 Cl. 60-415.000.

Ross, Gerald F.: *See*—
Cronson, Harry M.; and Ross, Gerald F., 4,688,041, Cl. 342-17.000.

Ross, Kenneth M.: *See*—
Thompson, Craig W.; and Ross, Kenneth M., 4,688,195, Cl. 364-300.000.

Ross, Oakley G.: *See*—
Wedertz, Larry D.; Ross, Oakley G.; and Kristedja, David H., 4,688,040, Cl. 342-3.000.

Ross, Richard S.; Friedman, John E.; and Friedman, James A., to Tri-Rel, Inc. Convertible lounge chair/tote bag. 4,687,248, Cl. 297-129.000.

Ross, Roger F.: *See*—
DeGeorge, Peter J.; Ross, Roger F.; and Sims, Donald E., 4,687,353, Cl. 400-76.000.

Rotatrim Limited: *See*—
Hume, Kenneth J., deceased; and Ogborne, Laurence N., 4,686,876, Cl. 83-455.000.

Roucher, Christian: *See*—
Szoboszlai, Istvan; and Roucher, Christian, 4,687,271, Cl. 439-350.000.

Roucour, Jean: *See*—
Terneu, Robert; and Roucour, Jean, 4,687,687, Cl. 428-34.000.

Rousseau, Alain: *See*—
Picciotto, Robert; Ramel, Francois; Rousseau, Alain; and Touzin, Philippe, 4,687,268, Cl. 439-55.000.

Rousset, Jacky: *See*—
Gonnet, Olivier; and Rousset, Jacky, 4,687,789, Cl. 523-122.000.

Rowan, Hugh H.: *See*—
Cordova, David S.; Rowan, Hugh H.; and Lin, Leroy C., 4,687,796, Cl. 523-466.000.

Rozsa, Karoly: *See*—
Fenyo, Marta; Kertesz, Ivan; Rozsa, Karoly; and Szego, Peter, 4,686,986, Cl. 128-396.000.

RTE Corporation: *See*—
Mikulecky, Harvey W., 4,688,145, Cl. 361-349.000.

Rubin, Albert L.: *See*—
Miyata, Teruo; and Rubin, Albert L., 4,687,518, Cl. 106-161.000.

Rudman, Peter S.: *See*—
Goodell, Paul D.; Huston, Ernest L.; Rudman, Peter S.; and Sandrock, Gary D., 4,687,650, Cl. 423-248.000.

Rukavina, Lou: *See*—
Soeffker, Eldred E.; and Rukavina, Lou, 4,686,735, Cl. 15-320.000.

Rundt, Kenneth: *See*—
Nurmi, Jarmo; Rundt, Kenneth; and Oikari, Timo, 4,687,935, Cl. 250-361.00R.

Runzheimer, Hans-volker; Nehen, Ulrich; and Jabs, Gert. Imidazo[1,5-A]pyridylmethanes. 4,687,853, Cl. 546-121.000.

Runzi, Kurt. Method of aligning cut sheets in typewriters, output printers or the like. 4,687,362, Cl. 400-630.000.

Rupp, Herbert E. Mobile radio antenna support devices. 4,687,168, Cl. 248-539.000.

Rupprechter, Helmut: *See*—
Rock, Erich; and Rupprechter, Helmut, 4,686,769, Cl. 33-197.000.

Rusche, Gerald A.; and Forsch, Henry A., to United States of America, Army. Infrared image cathode ray tube. 4,687,967, Cl. 313-477.00R.

Rusche, Jochen: *See*—
Ballschuh, Detlef; Seibt, Horst; Rusche, Jochen; and Ohme, Roland, 4,687,602, Cl. 260-501.120.

Rusina , Fulvio: *See*—
Dal Degan, Neviano; and Rusina , Fulvio, 4,688,224, Cl. 371-31.000.

Russell, David B.; Gitlitz, Melvin H.; Leiner, Howard H.; Khuddus, Mo A.; and Berger, Abe, to M&T Chemicals Inc. Erodible ship-bottom paints for control of marine fouling. 4,687,792, Cl. 523-177.000.

Russell, George W.; and Underwood, Larry B. Linear electric motor for downhole use. 4,687,054, Cl. 166-66.400.

Russell, John W.: *See*—
Caserza, David D.; and Russell, John W., 4,686,886, Cl. 89-11.000.

Russo, Libby J. Brushing cyanoacrylates: packaging and method. 4,687,827, Cl. 427-340.000.

Ruth, Marta R.: *See*—
Tracy, C. Edwin; Benson, David K.; and Ruth, Marta R., 4,687,560, Cl. 204-164.000.

Ryu, Toshihiko: *See*—
Tahara, Masato; Matsuura, Tooru; and Ryu, Toshihiko, 4,688,235, Cl. 375-102.000.

S&C Electric Company: *See*—
Biller, Bruce A., 4,687,277, Cl. 439-621.000.

Sable, Daniel M.: *See*—
Corrington, Donald G.; Hawkins, Stephen D.; and Sable, Daniel M., 4,688,250, Cl. 380-23.000.

Saburi, Akio, to NEC Corporation. Station relief arrangement for use in relieving operation of a reference station in a TDMA network without reduction of frame availability. 4,688,216, Cl. 370-104.000.

Sadhir, Rajender K.: *See*—
Siemon, John T.; and Sadhir, Rajender K., 4,687,681, Cl. 427-40.000.

Safe Bridge AB: *See*—
Gadde, Villy, 4,688,024, Cl. 340-550.000.

Safe Flight Instrument Corporation: *See*—
Greene, Leonard M., 4,686,923, Cl. 114-140.000.

Sage, Howard M.: *See*—
Petty, Dean M.; and Sage, Howard M., 4,686,798, Cl. 51-216.0LP.

Saggese, Giuseppe: *See*—
Cortesi, Paolo; Donati, Gianni; and Saggese, Giuseppe, 4,687,643, Cl. 422-150.000.

Sagou, Seiji; and Itou, Takeo, to Kabushiki Kaisha Toshiba. Method of manufacturing phosphor screen of cathode ray tube. 4,687,825, Cl. 427-54.100.

Sahara, Hideshi. Retractable type wiper apparatus. 4,686,733, Cl. 15-250.160.

St. Louis, Robert M., to Camco Inc. Anti-tilt system for appliances. 4,687,262, Cl. 312-276.000.

Saito, Mitsuo; Aikawa, Takeshi; and Mori, Akio, to Tokyo Shibaura Denki Kabushiki Kaisha. Image display control apparatus. 4,688,032, Cl. 340-799.000.

Saito, Nobuto: *See*—
Miyajima, Tamotsu; Tanaka, Noriatsu; and Saito, Nobuto, 4,687,791, Cl. 523-161.000.

Saito, Shinji: *See*—
Ogawa, Hiroshi; Saito, Shinji; Mizuno, Chiaki; and Tamai, Yasuo, 4,687,710, Cl. 428-447.000.

Saito, Toshihiko: *See*—
Matsuzaka, Takashi; Saito, Toshihiko; and Hisaoka, Satoshi, 4,687,435, Cl. 431-1.000.

Saitoh, Koichi: *See*—
Fujimura, Yoshihiko; Saitoh, Koichi; and Suemitsu, Yuji, 4,686,933, Cl. 118-623.000.

Saitoh, Kuniyuki: *See*—
Shigeta, Masatomo; Saitoh, Kuniyuki; and Fukuda, Hiroyuki, 4,687,607, Cl. 264-29.500.

Saitou, Masao, to Kabushiki Kaisha Toshiba. Transfer material holding cassette including core rotation inhibiting means. 4,687,358, Cl. 400-208.000.
Saka, Nannaji: *See*—
Suh, Nam P.; Saka, Nannaji; and Liou, Ming J., 4,687,274, Cl. 439-426.000.
Sakai, Keijiro: *See*—
Mutoh, Nobuyoshi; Sakai, Keijiro; Suzuki, Toshio; Ueda, Akiteru; Nandoh, Kenji; and Okajima, Ikuo, 4,688,162, Cl. 363-80.000.
Sakai, Shinji; and Kawabata, Takashi, to Canon Kabushiki Kaisha. Automatic focusing device having a hunting prevention circuit. 4,687,915, Cl. 250-201.000.
Sakaki, Hiroyuki. Mobility-modulation field-effect transistor. 4,688,061, Cl. 357-22.000.
Sakamoto, Nobuyoshi, to Omron Tateisi Electronics Co. Electronic cash register. 4,688,174, Cl. 364-405.000.
Sakanaka, Eiichi: *See*—
Matsui, Hirotoshi; Tsumura, Takeo; and Sakanaka, Eiichi, 4,687,356, Cl. 400-144.200.
Sakano, Kozaburo: *See*—
Yazaki, Jinichi; and Sakano, Kozaburo, 4,687,689, Cl. 428-35.000.
Sakata, Yoshiya: *See*—
Shiba, Haruo; Sato, Takateru; Tanaka, Kimio; and Sakata, Yoshiya, 4,688,128, Cl. 360-132.000.
Sakatani, Atushi: *See*—
Inoue, Nori; Moriai, Yasuharu; Sakatani, Atushi; and Yoshida, Noriyuki, 4,688,149, Cl. 361-399.000.
Sakuma, Shin: *See*—
Ginnaga, Akihiro; Koba, Hiroshi; Sakuma, Shin; Kitagawa, Hisashi; Yamada, Akira; and Suzuki, Yoji, 4,687,738, Cl. 435-68.000.
Sakurai, Yasuhisa: *See*—
Ogata, Naoya; Sanui, Kohei; Yui, Nobuhiko; Nojima, Kazuhiko; Kataoka, Kazunori; Okano, Teruo; and Sakurai, Yasuhisa, 4,687,831, Cl. 528-64.000.
Salani, Steven J.; and Moffatt, Jeffrey C., to Forte Music, Inc. Digital interface for acoustic and electrically amplified pianos. 4,686,880, Cl. 84-1.010.
Salo, Rodney W.; and Pederson, Brian D., to Cardiac Pacemakers, Inc. Biomedical method and apparatus for controlling the administration of therapy to a patient in response to changes in physiologic demand. 4,686,987, Cl. 128-419.0PG.
Salomon, Georges P. J., to Salomon S.A. Pivotable ski binding assembly comprising a braking system. 4,687,221, Cl. 280-605.000.
Salomon S.A.: *See*—
Salomon, Georges P. J., 4,687,221, Cl. 280-605.000.
Salter, Stephen J.: *See*—
Pathak, Prabodh; Salter, Stephen J.; Gonzalez, Jay A.; and Perkins, Thomas K., 4,687,059, Cl. 166-271.000.
Saltzman, Jeremy: *See*—
Dwyer, John J.; Saltzman, Jeremy; and Hipp, Betsy, 4,688,117, Cl. 360-72.300.
Salutar, Inc.: *See*—
Quay, Steven C., 4,687,658, Cl. 424-9.000.
Quay, Steven C., 4,687,659, Cl. 424-9.000.
Samis, Philip L. Engraving apparatus having improved bearing and pattern. 4,687,390, Cl. 409-92.000.
San Diego Levco Corporation: *See*—
Johnson, Curtis F.; and Gilbert, Douglas J., 4,687,265, Cl. 439-68.000.
Sanborn, Steven L.; and Neumeyer, Martin J., to AM General Corporation. Turret system for lightweight military vehicle. 4,686,888, Cl. 89-37.130.
Sanden, Gerald F.: *See*—
Oltman, John E.; and Sanden, Gerald F., 4,687,714, Cl. 429-27.000.
Sander, Hans: *See*—
Lenz, Werner; Sander, Hans; and Moeller, Dieter, 4,687,813, Cl. 525-131.000.
Sanders Associates, Inc.: *See*—
Stromswold, Chester E., 4,688,003, Cl. 331-25.000.
Sanders, Frederick W.: *See*—
Wright, Richard F.; Adair, Paul C.; and Sanders, Frederick W., 4,687,725, Cl. 430-138.000.
Sanders, Rudolf; and van Seggelen, Godefridus G., to U.S. Philips Corporation. Capped electric lamp. 4,687,965, Cl. 313-318.000.
Sandhu, Mohammad A.: *See*—
Wu, Stephen H.; and Sandhu, Mohammad A., 4,687,676, Cl. 427-3.000.
Sandoz Ltd.: *See*—
Henzi, Beat, 4,687,842, Cl. 534-607.000.
Sandrock, Gary D.: *See*—
Goodell, Paul D.; Huston, Ernest L.; Rudman, Peter S.; and Sandrock, Gary D., 4,687,650, Cl. 423-248.000.
Sangu, Isao, to NEC Corporation. Helical scan tracking apparatus including means for correcting for track curvature. 4,688,109, Cl. 360-10.200.
Sankey, John P.: *See*—
Comyns, Alan E.; Morris, Gareth W.; and Sankey, John P., 4,687,871, Cl. 556-138.000.
Sankyo Company Limited: *See*—
Konotsune, Takuo; and Kawakubo, Katsuhiko, 4,687,858, Cl. 548-243.000.
Sanofi: *See*—
Martinez, Jean; Bali, Jean-Pierre; Magous, Richard; Castro, Bertrand; and Demarne, Henri, 4,687,759, Cl. 514-18.000.
Martinez, Jean; Bali, Jean-Pierre; Magous, Richard; Castro, Bertrand; and Demarne, Henri, 4,687,760, Cl. 514-18.000.
Sanshin Kogyo Kabushiki Kaisha: *See*—
Ariga, Susumu, 4,686,941, Cl. 123-26.000.
Sansom, Melanie J.: *See*—
Lipson, Erik; and Sansom, Melanie J., 4,687,306, Cl. 351-51.000.
Santa Fe International Corporation: *See*—
Recalde, Carlos E., 4,687,376, Cl. 405-168.000.
Santen, Sven; and Johansson, Borje, to SKF Steel Engineering AB. Condensation of zinc vapor. 4,687,513, Cl. 75-88.000.
Santii, Robert J.; and Aldieri, Raymond, to Lori Corporation. Key duplication machine. 4,687,389, Cl. 409-81.000.
Santostasi, Paul A.: *See*—
Dutt, Herbert V.; and Santostasi, Paul A., 4,687,116, Cl. 220-270.000.
Santrade Limited: *See*—
Eklof, Ake T.; and Wiredal, Harry A. I., 4,687,368, Cl. 403-343.000.
Roos, Aage V., 4,687,387, Cl. 408-144.000.
Sanui, Kohei: *See*—
Ogata, Naoya; Sanui, Kohei; Yui, Nobuhiko; Nojima, Kazuhiko; Kataoka, Kazunori; Okano, Teruo; and Sakurai, Yasuhisa, 4,687,831, Cl. 528-64.000.
Sari, Hikmet: *See*—
Desperben, Lydie; Sari, Hikmet; and Moridi, Said, 4,687,999, Cl. 329-109.000.
Sarstedt, Walter; and Korf, Dieter, to Walter Sarstedt Kunststoff-Spritzgusswerk. Blood storage device. 4,687,479, Cl. 604-403.000.
Sasaki, Isao; and Mori, Hiroshi, to Mitsubishi Rayon Co., Ltd. Polymerization process for polyester. 4,687,811, Cl. 525-100.000.
Sasaki, Satoshi: *See*—
Suzuki, Migaku; Sasaki, Satoshi; Mitsuno, Takashi; and Inagaki, Hiroyuki, 4,687,477, Cl. 604-385.00A.
Sasaki, Shuichi: *See*—
Kambe, Mitsuru; and Sasaki, Shuichi, 4,687,624, Cl. 376-264.000.
Sasaki, Teruo: *See*—
Tominaga, Ichiro; and Sasaki, Teruo, 4,687,205, Cl. 273-169.000.
Sasao, Isamu; and Takaoka, Yoshiyasu, to Honda Giken Kogyo Kabushiki Kaisha. Fuel injection valve with fluid honed discharge port and associated methods of production. 4,687,142, Cl. 239-533.300.
Sato, Rejiro: *See*—
Suzuki, Akira; Mizuta, Yukio; Sato, Rejiro; and Shimizu, Kunio, 4,688,156, Cl. 362-354.000.
Sato, Takateru: *See*—
Shiba, Haruo; Sato, Takateru; Tanaka, Kimio; and Sakata, Yoshiya, 4,688,128, Cl. 360-132.000.
Sato, Takushi: *See*—
Ibi, Akira; Sato, Takushi; Yamaguchi, Akihiro; Takahashi, Shigeru; Shishido, Shigeyuki; Tamai, Shoji; and Nakajima, Hisai, 4,687,836, Cl. 528-353.000.
Sato, Toru; Okazaki, Naoto; Hasegawa, Toshihisa; Fujii, Katsumasa; and Takano, Kazukiyo, to Tottori University. Breath synchronized gas-insufflation device and method therefor. 4,686,974, Cl. 128-204.230.
Sato, Yoichi: *See*—
Aoki, Takashi; Sato, Yoichi; and Fukuda, Yukihiro, 4,686,872, Cl. 74-869.000.
Sato, Yuichi: *See*—
Tsunekawa, Tokuichi; Sato, Yuichi; Kawabata, Takashi; and Matsumura, Susumu, 4,687,914, Cl. 250-201.000.
Satoh, Isao: *See*—
Koishi, Kenji; Matsuo, Tamotsu; and Satoh, Isao, 4,688,203, Cl. 369-48.000.
Satoh, Ryohei: *See*—
Miyauchi, Tateoki; Yamaguchi, Hiroshi; Hongo, Mikio; Mizukoshi, Katsuro; Shimase, Akira; and Satoh, Ryohei, 4,687,939, Cl. 250-492.200.
Satoh, Shinichi: *See*—
Obitsu, Takeo; Igaki, Tetsuo; Kinoshita, Kimiaki; Nanbu, Morio; and Satoh, Shinichi, 4,687,862, Cl. 549-224.000.
Satoji, Fuminori, to NTN-Rulon Industries Co., Ltd. Finger strips for copying machines. 4,687,696, Cl. 428-192.000.
Satomura, Shigeyuki: *See*—
Takahashi, Toshihiko; Inazawa, Yoshizumi; Tani, Toshiyuki; and Satomura, Shigeyuki, 4,688,115, Cl. 360-70.000.
Sauers, Richard F.: *See*—
Hay, James V.; and Sauers, Richard F., 4,687,508, Cl. 71-92.000.
Savides, John: *See*—
Kamel, Ahmed A.; Graul, Donald W.; Savides, John; and Hanson, Charles W., 4,688,092, Cl. 358-109.000.
Sawada, Morio, to Murata Kikai Kabushiki Kaisha. Robot system for encasing cone-like articles. 4,686,813, Cl. 53-446.000.
Sawaide, Minoru; Ishikawa, Noboru; and Shiokawa, Hideyo, to Shimizu Construction Co., Ltd. Concrete composition having heat resisting property and dimensional stability. 4,687,517, Cl. 106-96.000.
Saylor, Douglas D.: *See*—
Banzi, Frederick J., Jr.; Dugan, Michael J.; Johnson, Randolph W.; Saylor, Douglas D.; and Sharper, Craig A., 4,688,209, Cl. 370-15.000.
Scarabino, Mario J.; Peter, Emmett B.; and Rettner, Gerald F., to Unisys Corporation. Dual force jogger/stacker for cut sheet items. 4,687,193, Cl. 271-184.000.
Scarfone, Frank A.: *See*—
Snyder, Leon T.; Scarfone, Frank A.; Reuss, James L.; Campen, George V.; and Yates, George H., 4,686,999, Cl. 128-716.000.
Schaaf, David E.; and Jorna, Fransesco M., to Versatile Corporation. Seed planter. 4,686,914, Cl. 111-73.000.

Schaefer, Henry A.; and Garner, Terry N., to General Electric Company. Externally connectable control unit for a portable radio. 4,688,262, Cl. 455-89.000.
Schaeffer, Hans A. Dental preparation, article and method for storage and delivery thereof. 4,687,663, Cl. 424-52.000.
Schaffner, Donald R.; and Leeds, Donald H., to B. F. Goodrich Company, The. Heat dissipation means for X-ray generating tubes. 4,688,239, Cl. 378-141.000.
Schamel, Alfred H.: *See—*
Mallory, Robert L.; Schamel, Alfred H.; and Sekel, Stephen M., 4,688,148, Cl. 361-395.000.
Scheffel, Gary W.: *See—*
Simonelli, James K.; and Scheffel, Gary W., 4,687,180, Cl. 251-122.000.
Simonelli, James K.; Scheffel, Gary W.; and Jagielo, Joseph J., 4,687,181, Cl. 251-223.000.
Schell, Ferenc, to Polytex AG. Gripper head. 4,687,241, Cl. 294-61.000.
Schenk, Heinrich, to Siemens Aktiengesellschaft. Method and circuit arrangement for compensating cross-talk and/or echo signals. 4,688,245, Cl. 379-410.000.
Scherger, John S. Method and apparatus for restoring curvature to the spine. 4,686,968, Cl. 128-72.000.
Schering Corporation: *See—*
Smith, Sidney R.; and Siegel, Marvin I., 4,687,774, Cl. 514-293.000.
Schide, John N.: *See—*
Galvin, Aaron A.; Mason, Douglas L.; Leff, Kenneth J.; Schide, John N.; and Giffone, Ralph A., 4,687,924, Cl. 250-216.000.
Schiele, August, to Kuka Wehtechnik GmbH. Apparatus for supplying cartridge belts from a magazine to a machine gun. 4,686,887, Cl. 89-33.160.
Schillaci, Samuel P., to Figgie International Inc. Chlorine gas filtering material suitable for use in a chemical oxygen generator. 4,687,640, Cl. 422-120.000.
Schilling, Albert: *See—*
Piller, Horst; and Schilling, Albert, 4,687,304, Cl. 350-526.000.
Schlegel Corporation: *See—*
Hjalmer, William D.; and Carns, Hutchinson W., 4,686,918, Cl. 112-410.000.
Schlodder, Rainer: *See—*
Renner, Hermann; Kleiss, Karlheinz; and Schlodder, Rainer, 4,687,514, Cl. 75-109.000.
Schlogl, Gunter; Mack, Gerhard; and Michel, Manfred, to Hoechst Aktiengesellschaft. Photosensitive recording material for use in the production of negative-working planographic printing plates with diazonium polycondensate and inorganic pigment. 4,687,726, Cl. 430-175.000.
Schlumberger Technology Corporation: *See—*
Wiggins, Ralphe, 4,688,198, Cl. 367-46.000.
Schmaler, Dieter H.: *See—*
Klanner, Wilfried; Schmaler, Dieter H.; Wetter, Hermann; Felsch, Bernhard; and Czernakowski, Waldemar, 4,687,255, Cl. 297-488.000.
Schmid, Franz, to H. Stoll GmbH & Co. Flat knitting machine with needle selection device. 4,686,839, Cl. 66-75.200.
Schmidt, Gunther; and Koch, Joseph W. M., to W. Strikfeldt & Koch GmbH. Shaft melting furnace for melting metals. 4,687,438, Cl. 432-57.000.
Schmidt, Paul J.; and Hung, William M., to Hilton-Davis Chemical Co., The. Marking systems. 4,688,059, Cl. 503-220.000.
Schmitt-Maass, Nikolaus: *See—*
Baumert, Heinz; Schmitt-Maass, Nikolaus; and Karb, Erich, 4,687,254, Cl. 297-481.000.
Schmitt, Walter, to Johannes Heidenhain GmbH. Signal transmission system. 4,688,019, Cl. 340-347.00P.
Schneider, Claus: *See—*
Von Benda, Klaus; and Schneider, Claus, 4,687,719, Cl. 429-234.000.
Schneider, Glenn H., to Motorola Computer Systems, Inc. Direct memory access controller supporting multiple input/output controllers and memory units. 4,688,166, Cl. 364-200.000.
Schneider, Rudolf, to Erowa AG. Measuring calliper. 4,686,768, Cl. 33-172.00B.
Schobel, Alexander M., to Warner-Lambert Company. Therapeutic effervescent composition. 4,687,662, Cl. 424-44.000.
Schoettle, Klaus; Buhk, Artur; Kamm, Eugen; Berger, Heinz; and Gaiser, Dieter, to BASF Aktiengesellschaft. Tape cassette, in particular a video cassette, and a pressure spring for this. 4,687,157, Cl. 242-199.000.
Schrieber, Ricky J., to Allied Corporation. Method and apparatus for generating a set of signals representing a curve. 4,688,182, Cl. 364-523.000.
Schroder, Ulf, to Gambro Lundia AB. Magnetic carbohydrate particles as carriers for affinity separation purposes. 4,687,748, Cl. 436-526.000.
Schrodter, Hermann; Braun, Albert; and Kampmann, Friedrich-Wilhelm, to Hoechst Aktiengesellschaft. Desulfurizing mixture for metal melts, process for making it, and process for desulfurizing liquid metal therewith. 4,687,512, Cl. 75-58.000.
Schroeder, Peter J.: *See—*
Cullen, Paul R.; and Schroeder, Peter J., 4,687,244, Cl. 294-86.410.
Schroedter, Wolfgang: *See—*
Doelves, Juergen; and Schroedter, Wolfgang, 4,688,101, Cl. 358-299.000.
Schubert & Salzer: *See—*
Schuller, Edmund; Bohm, Gunther; and Karl, Rupert, 4,687,148, Cl. 242-18.0PW.
Schuller, Edmund; Bohm, Gunther; and Karl, Rupert, to Schubert & Salzer. Apparatus and process for forming a thread-reserve winding. 4,687,148, Cl. 242-18.0PW.
Schultes, Tilmann; and Seidel, Joachim, to Kortenbach Verwaltungs- und Beteiligungsgesellschaft mgH & Co. Telescopic stick for a shortenable umbrella. 4,687,012, Cl. 135-75.000.
Schultz, E. Frank: *See—*
Hall, Arthur C.; Schultz, E. Frank; and Wiener, Ludwig D., 4,687,523, Cl. 134-30.000.
Schultz, Steven G., to Abbott Laboratories. Spectrophotometer. 4,687,329, Cl. 356-328.000.
Schumann, Guenter: *See—*
Arndt, Jentzsch; Schumann, Guenter; and Stellmacher, Wolfgang, 4,686,901, Cl. 101-148.000.
Schutz, Erwin: *See—*
Jekat, Herbert; Schutz, Erwin; and Stork, Kurt, 4,687,547, Cl. 159-3.000.
Schwab, Carl E., to ISC Cardion Electronics, Inc. ADF bearing and location for use with ASR and ASDE displays. 4,688,046, Cl. 342-456.000.
Schwaha, Karl: *See—*
Kriegner, Othmar; Lang, Franz; Holleis, Gunter; Schwaha, Karl; and Granitz, Fritz, 4,687,141, Cl. 239-520.000.
Schwarz, Otto: *See—*
Philapitsch, Anton; Wober, Gunter; Eibl, Johann; and Schwarz, Otto, 4,687,664, Cl. 424-85.000.
Scopatz, Stephen D.: *See—*
Brown, Ian A.; McMahon, Dennis R.; Rosas, Robin R.; Scopatz, Stephen D.; and Wind, Karen L., 4,687,107, Cl. 209-556.000.
Scott, Edwin R. Knee brace having upper cuff with crossed straps. 4,686,969, Cl. 128-80.00C.
Scribner, James R.; Brown, Thomas G.; and Caracciolo, Anthony, Jr. Method of collecting and using data associated with tagged objects. 4,688,026, Cl. 340-572.000.
Scribner, Richard A.; and Norton, James A., to Media Systems Technology, Inc. Automated floppy disk drive loader. 4,688,124, Cl. 360-99.000.
Scripps Clinic and Research Foundation: *See—*
Hanson, Stephen R., 4,687,482, Cl. 623-1.000.
Sculatti, Ron. Flying model rocket and method of recovery. 4,687,455, Cl. 446-52.000.
Scully, Michael J.: *See—*
Cosmos, Pete; Scully, Michael J.; and Stephenson, Brian D., 4,687,263, Cl. 439-108.000.
Sdunek, Bruce C.: *See—*
Bakhaus, Kenneth C.; and Sdunek, Bruce C., 4,687,164, Cl. 248-27.300.
Secord, Tyrone R.: *See—*
Bell, Robert L.; and Secord, Tyrone R., 4,687,252, Cl. 297-374.000.
Seeger, Hanspeter. Installation for the dispersion or emulsification of a mass consisting of at least two products. 4,687,339, Cl. 366-305.000.
Seeliger, Wolfgang: *See—*
Bartmann, Martin; and Seeliger, Wolfgang, 4,687,834, Cl. 528-291.000.
Seiberco Incorporated: *See—*
Horber, Ralph W., 4,687,961, Cl. 310-186.000.
Seibt, Horst: *See—*
Ballschuh, Detlef; Seibt, Horst; Rusche, Jochen; and Ohme, Roland, 4,687,602, Cl. 260-501.120.
Seidel, Joachim: *See—*
Schultes, Tilmann; and Seidel, Joachim, 4,687,012, Cl. 135-75.000.
Seigenji, Kiyoshi: *See—*
Tanii, Junichi; Yamaki, Toshio; and Seigenji, Kiyoshi, 4,687,266, Cl. 439-77.000.
Seiz, Carl G.: *See—*
Seiz, Frederick G.; Seiz, Carl G.; and Egner, Robert J., 4,687,404, Cl. 414-276.000.
Seiz Corporation: *See—*
Seiz, Frederick G.; Seiz, Carl G.; and Egner, Robert J., 4,687,404, Cl. 414-276.000.
Seiz, Frederick G.; Seiz, Carl G.; and Egner, Robert J., to Seiz Corporation. Load transfer apparatus for push-in flow racks. 4,687,404, Cl. 414-276.000.
Sekel, Stephen M.: *See—*
Mallory, Robert L.; Schamel, Alfred H.; and Sekel, Stephen M., 4,688,148, Cl. 361-395.000.
Selbach, Gerd. Laser-based measuring system. 4,687,324, Cl. 356-1.000.
Self, Freddy. Fire extinguisher extractor apparatus. 4,687,032, Cl. 141-18.000.
Seliger, Robert L.: *See—*
Ward, J. William; Bartelt, John L.; Seliger, Robert L.; and McKenna, Charles M., 4,687,940, Cl. 250-492.200.
Selim, Ahmed E.; and Weilbacker, Thomas O., to Allied Corporation. Serial bus for master/slave computer system. 4,688,171, Cl. 364-200.000.
Selzer, Robert J., to Navistar International Corporation. Dual offset cantilevered spring suspension. 4,687,224, Cl. 280-718.000.
Semiconductor Energy Laboratory Co., Ltd.: *See—*
Yamazaki, Shunpei, 4,686,760, Cl. 437-5.000.
Seng, Hans-Peter, to Zeller+Gmelin GmbH & Co. One-component formulation for detackifying and coagulating synthetic resin paint fractions in wet deparators of paint-spraying installations, and the use thereof. 4,687,520, Cl. 106-271.000.
Serafini, Giulio: *See—*
Ripani, Sergio; and Serafini, Giulio, 4,688,177, Cl. 364-468.000.

Serizawa, Mitsuya: *See*—
Kawamoto, Yoshimich; Furukawa, Yoshimi; Hamada, Tetsuro; and Serizawa, Mitsuya, 4,687,216, Cl. 280-91.000.

Seth Products, Inc.: *See*—
Skjerseth, Douglas N., 4,686,910, Cl. 108-153.000.

Seybold, Frederick W. Rotary internal combustion engine with uniformly rotating pistons cooperating with reaction elements having a varying speed of rotation and oscillating motion. 4,687,427, Cl. 418-34.000.

Seymour, Frederick C.: *See*—
Martin, Roger J.; McKee, William C.; Vader, Scott J.; and Seymour, Frederick C., 4,687,428, Cl. 425-60.000.

Shah, Hemant H.: *See*—
Cellier, Francis; Graulty, Robert T.; Johnson, Wendell L.; Batson, David M.; Limpert, John C.; Wu, Christopher K. C.; Bucher, George D.; John, Clarence D., Jr.; Steinkirchner, John E.; Larouere, Paula J.; Shah, Hemant H.; and Williams, Robert A., 4,687,605, Cl. 264-0.500.

Shah, Prabodh L.: *See*—
Noyes, George I., Jr.; and Shah, Prabodh L., 4,688,204, Cl. 369-59.000.

Shanks, Robert E.: *See*—
Pumphrey, John G.; and Shanks, Robert E., 4,687,336, Cl. 356-436.000.

Sharp Kabushiki: *See*—
Ehara, Shaw; Kojima, Yoshimi; Imada, Eiji; Hayakawa, Takashi; and Matsuyama, Toshiro, 4,687,724, Cl. 430-84.000.

Sharp Kabushiki Kaisha: *See*—
Fujii, Yoshihalu, 4,687,315, Cl. 355-3.0FU.
Kato, Tomio, 4,688,082, Cl. 358-21.00R.
Matsui, Hirotoshi; Tsumura, Takeo; and Sakanaka, Eiichi, 4,687,356, Cl. 400-144.200.
Mitarai, Akira; and Kubota, Kunio, 4,688,173, Cl. 364-405.000.
Nagano, Fumikazu, 4,687,919, Cl. 250-205.000.
Nakanishi, Yasushi; and Taniguchi, Akihiko, 4,687,320, Cl. 355-14.00R.

Sharp, Phillip A.; Capecchi, Mario R.; RajBhandary, Uttam L.; and Laski, Frank A., to Massachusetts Institute of Technology. Mammalian suppressor genes. 4,687,737, Cl. 435-68.000.

Sharper, Craig A.: *See*—
Banzi, Frederick J., Jr.; Dugan, Michael J.; Johnson, Randolph W.; Saylor, Douglas D.; and Sharper, Craig A., 4,688,209, Cl. 370-15.000.

Sharples, Thomas D., to Beckman Instruments, Inc. Method of forming slots in a material-retaining plate for a packed column reactor in an analytical instrument. 4,686,752, Cl. 29-163.50R.

Shaw, Eric D. Expandible and collapsible acoustic guitar. 4,686,882, Cl. 84-291.000.

Sheesley, Wilmer L.: *See*—
Birch, Norman R.; Pauza, William V.; and Sheesley, Wilmer L., 4,687,446, Cl. 439-553.000.

Shell Oil Company: *See*—
Graiff, Leonard B.; and Holmes, Robert T., 4,687,034, Cl. 141-69.000.
Langner, Carl G., 4,687,377, Cl. 405-169.000.
Nozaki, Kenzie, 4,687,876, Cl. 585-509.000.
Wong, Pui K., 4,687,815, Cl. 525-271.000.

Shelton, Jay W. Cigarette fire safety apparatus. 4,687,006, Cl. 131-257.000.

Shepherd, John L.: *See*—
DeWitt, Gregory S.; Driscoll, John J.; and Shepherd, John L., 4,688,214, Cl. 370-94.000.

Sherwood, Donald G.: *See*—
Gillett, James E.; Garner, Daniel C.; and Sherwood, Donald G., 4,687,628, Cl. 376-353.000.

Sherwood Medical Company: *See*—
Okada, Yosuke, 4,687,470, Cl. 604-171.000.

Sheyon, Gregory M.; and Aurichio, Joseph A., to Stauffer Chemical Company. Adhesively mountable die attach film. 4,687,693, Cl. 428-148.000.

Shiba, Haruo; Sato, Takateru; Tanaka, Kimio; and Sakata, Yoshiya, to TDK Corporation. Magnetic tape cassette having two layered portions. 4,688,128, Cl. 360-132.000.

Shibasaki, Sohei; Iwasaki, Yasumasa; and Ono, Noriki, to Casio Computer Co, Ltd.; and Casio Electronics Manufacturing Co., Ltd. Copying apparatus. 4,687,318, Cl. 355-5.000.

Shibata, Hidenori: *See*—
Kon, Takao; Yano, Kensaku; Kakegawa, Masayuki; and Shibata, Hidenori, 4,688,098, Cl. 358-213.190.

Shibata, Kenji: *See*—
Kuroda, Hiroshi; Nishimura, Tsukasa; Nishimura, Masakatsu; Hashimoto, Taiki; Kanda, Osamu; Nozawa, Shigeru; and Shibata, Kenji, 4,687,649, Cl. 423-242.000.

Shichi, Hiroyasu: *See*—
Tamura, Hifumi; Yamamoto, Shigehiko; Shichi, Hiroyasu; and Ishitani, Toru, 4,687,930, Cl. 250-309.000.
Tamura, Hifumi; and Shichi, Hiroyasu, 4,687,938, Cl. 250-423.00F.

Shigeta, Masatomo; Saitoh, Kuniyuki; and Fukuda, Hiroyuki, to Kureha Kagaku Kogyo Kabushiki Kaisha. Process for producing electrode substrate for use in fuel cells. 4,687,607, Cl. 264-29.500.

Shigeta, Tadao. Gasified fuel combustion apparatus. 4,687,436, Cl. 431-173.000.

Shiki, Takeshi: *See*—
Ito, Yasuro; Higuchi, Yoshiro; Shiki, Takeshi; Tsuji, Yukikazu; Tsuji, Masanori; and Hayakawa, Mitsutaka, 4,686,852, Cl. 73-61.00R.

Shimase, Akira: *See*—
Miyauchi, Tateoki; Yamaguchi, Hiroshi; Hongo, Mikio; Mizukoshi, Katsuro; Shimase, Akira; and Satoh, Ryohei, 4,687,939, Cl. 250-492.200.

Shimizu Construction Co., Ltd.: *See*—
Sawaide, Minoru; Ishikawa, Noboru; and Shiokawa, Hideyo, 4,687,517, Cl. 106-96.000.

Shimizu, Hiroshi: *See*—
Nakatsuka, Iwao; Shimizu, Hiroshi; and Yoshitake, Akira, 4,687,852, Cl. 546-20.000.

Shimizu, Kiyoshi: *See*—
Harada, Susumu; Shimizu, Kiyoshi; and Ujiie, Masayuki, 4,687,817, Cl. 525-375.000.

Shimizu, Kunio: *See*—
Suzuki, Akira; Mizuta, Yukio; Sato, Rejiro; and Shimizu, Kunio, 4,688,156, Cl. 362-354.000.

Shimizu, Norimitsu, to Fuji Xerox Company, Limited. Power supply for discharge lamp. 4,687,971, Cl. 315-244.000.

Shimizu, Osamu, to Ohkura Electric Co., Ltd. Multi-range controller. 4,688,194, Cl. 364-571.000.

Shimizu, Tasuku: *See*—
Hasegawa, Kunio; Shimizu, Tasuku; Horiuchi, Tetsuo; and Ito, Hisao, 4,687,625, Cl. 376-292.000.

Shimizu, Yasuo; and Ogura, Masami, to Honda Giken Kogyo Kabushiki Kaisha. Centrifugal clutch instantly engageable and disengageable. 4,687,085, Cl. 192-89.00W.

Shimizu, Yasuo, to Honda Giken Kogyo. Electromagnetic servo device for electric power steering systems for vehicles. 4,687,976, Cl. 318-432.000.

Shimomura, Hiroshi; and Arai, Tatsuo, to Mitsubishi Kinzoku Kabushiki Kaisha. Insert rotary cutter. 4,687,383, Cl. 407-46.000.

Shimosato, Yoshio: *See*—
Hashimoto, Kazuyoshi; Nakano, Tsuneo; Arita, Kazutoyo; Fukuyama, Goro; and Shimosato, Yoshio, 4,687,125, Cl. 226-21.000.

Shin Nisso Kako Co., Ltd.: *See*—
Obitsu, Takeo; Igaki, Tetsuo; Kinoshita, Kimiaki; Nanbu, Morio; and Satoh, Shinichi, 4,687,862, Cl. 549-224.000.

Shindo, Shuko: *See*—
Ebisawa, Makoto; Shindo, Shuko; Hashizume, Kenichi; and Isa, Isao, 4,688,153, Cl. 361-433.000.

Shinohara, Terumi: *See*—
Narui, Hiroshi; and Shinohara, Terumi, 4,687,680, Cl. 427-38.000.

Shinohara, Yukimasa: *See*—
Ito, Michio; Shinohara, Yukimasa; and Imai, Nobuhiro, 4,687,283, Cl. 350-6.800.

Shiokawa, Hideyo: *See*—
Sawaide, Minoru; Ishikawa, Noboru; and Shiokawa, Hideyo, 4,687,517, Cl. 106-96.000.

Shiotari, Yoshihisa; and Nagao, Kenichi, to Kabushiki Kaisha Toshiba. Semiconductor integrated circuit device. 4,688,070, Cl. 357-40.000.

Shiozaki, Tomoharu: *See*—
Tanaka, Masato; Irii, Shinsuke; and Shiozaki, Tomoharu, 4,688,060, Cl. 503-214.000.

Shirai, Ichiro, to Nintendo Co., Ltd. Multi-directional switch. 4,687,200, Cl. 273-148.00B.

Shirai, Toshiaki: *See*—
Suzaki, Shunkichi; Shirai, Toshiaki; Adachi, Hisanobu; Hayashi, Masaharu; Hattori, Kenji; and Takakura, Yoshinari, 4,687,132, Cl. 236-35.000.

Shiraishi, Masao; Nishiya, Yoshinori; and Ito, Syoji, to Mitsubishi Petrochemical Co., Ltd. Exterior body part for automotive vehicle. 4,687,804, Cl. 524-505.000.

Shiraishi, Takashi; and Kitamura, Shiro, to Enushii Shangyo Co., Ltd. Bore measuring system. 4,687,328, Cl. 356-384.000.

Shireman, Paul M.: *See*—
Cameron, Donald C.; and Shireman, Paul M., 4,687,421, Cl. 417-296.000.

Shiroyanagi, Yoshiro: *See*—
Nakamura, Katsunori; Kurano, Akira; Shiroyanagi, Yoshiro; and Kishiro, Shigeru, 4,688,221, Cl. 371-13.000.

Shishido, Shigeyuki: *See*—
Ibi, Akira; Sato, Takushi; Yamaguchi, Akihiro; Takahashi, Shigeru; Shishido, Shigeyuki; Tamai, Shoji; and Nakajima, Hisai, 4,687,836, Cl. 528-353.000.

Shofner, Frederick M., to ppm, Inc. Methods for aeromechanical and electrodynamic release and separation of foreign matter from fiber. 4,686,744, Cl. 19-200.000.

Shoji, Makoto; Tsuyuguchi, Hiroshi; Toma, Shozo; Hiraki, Kazuhiro; and Morita, Tsutomu, to Teac Corporation. Power-saving data transfer apparatus with a flexible magnetic disk or the like. 4,688,112, Cl. 360-60.000.

Sholder, Jason A. Pacemaker system and method for measuring and monitoring cardiac activity and for determining and maintaining capture. 4,686,988, Cl. 128-419.0PT.

Showa Denko K.K.: *See*—
Hiraiwa, Tadashi; and Ando, Eizi, 4,686,774, Cl. 34-9.000.

Showa Denko Kabushiki Kaisha: *See*—
Matsubara, Mamoru, 4,686,776, Cl. 34-95.000.

Showell, Anthony D.: *See*—
Dove, John; and Showell, Anthony D., 4,686,970, Cl. 128-92.0YM.

Shuey, John R., to AMP Incorporated. Dual slot electrical contact and method of making same. 4,687,264, Cl. 439-92.000.

Shum, Wilfred P.; and Cooper, Charles F., to Atlantic Richfield Company. Production of molybdenum dioxo dialkyleneglycolate compositions for epoxidation of olefins. 4,687,868, Cl. 556-57.000.

Shutterly, Harold B.; and Malingowski, Joseph S., to Westinghouse Electric Corp. High-reliability fiber optic repeater. 4,688,260, Cl. 455-601.000.

SHW Schwabische Huttenwerke GmbH: *See*—
Andra, Wolfhart; Bayer, Karl; Beyer, Erwin; and Andra, Hans-Peter, 4,687,182, Cl. 254-93.00R.

Shyu, Jieh-Hwa, to OMI International Corporation. Electrolytic apparatus and process. 4,687,554, Cl. 204-23.000.

Siegel, Marvin I.: *See*—
Smith, Sidney R.; and Siegel, Marvin I., 4,687,774, Cl. 514-293.000.

Siegel, William J.: *See*—
Barkley, Vincent P.; and Siegel, William J., 4,687,907, Cl. 219-373.000.

Siemens Aktiengesellschaft: *See*—
Burgmeier, Juergen; and Doemer, Josef, 4,688,226, Cl. 371-57.000.
Heinle, Georg, 4,688,163, Cl. 363-96.000.
Krausse, Peter, 4,687,292, Cl. 350-96.210.
Moberg, Lennart, 4,686,990, Cl. 128-419.0PT.
Prussas, Herbert, 4,687,290, Cl. 350-96.200.
Schenk, Heinrich, 4,688,245, Cl. 379-410.000.
Tihanyi, Jenoe; Fellinger, Christine; and Leipold, Ludwig, 4,688,071, Cl. 357-41.000.

Siemens-Allis, Inc.: *See*—
Kleinecke, John D.; Farag, Samir F.; and Little, Thomas R., 4,688,144, Cl. 361-345.000.

Siemon, John T.; and Sadhir, Rajender K., to Westinghouse Electric Corp. Method of making a chemically bonded coating on a fibrous or filamentous substrate. 4,687,681, Cl. 427-40.000.

Silva, Robert E. System and method of delivering low/pressure/low temperature fluids into high pressure/high temperature heat exchangers by means of alternate pressure equalization. 4,686,831, Cl. 60-645.000.

Silver Brothers Limited: *See*—
Frey, Otto, 4,687,488, Cl. 623-22.000.

Sima Products Corporation: *See*—
Breslau, Steven M., 4,687,309, Cl. 354-82.000.

Simelunas, William J., to Nabisco Brands, Inc. Die head for converting a co-extruder apparatus. 4,687,429, Cl. 425-192.00R.

Simitomo Rubber Industries, Ltd.: *See*—
Tominaga, Ichiro; and Sasaki, Teruo, 4,687,205, Cl. 273-169.000.

Simon Engineering Dudley Limited: *See*—
Ashworth, Denis H., 4,687,073, Cl. 182-2.000.

Simonelli, James K.; and Scheffel, Gary W., to Nupro Company. Metering valve. 4,687,180, Cl. 251-122.000.

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Simonnet, Jacques, to Cogema. Centrifugal decanter of the pendulous type. 4,687,463, Cl. 494-83.000.

Sims, Donald E.: *See*—
DeGeorge, Peter J.; Ross, Roger F.; and Sims, Donald E., 4,687,353, Cl. 400-76.000.

Sims, Steven R.: *See*—
Oloff, Clarence M.; Hermann, Linda M.; Moss, William G.; and Sims, Steven R., 4,686,997, Cl. 128-653.000.

Sinchak, John L.: *See*—
Eichelberger, Edward B.; Langmaid, Roger N.; Lindbloom, Eric; Motika, Franco; Sinchak, John L.; and Waicukauski, John A., 4,687,988, Cl. 324-73.0AT.

Singer Company, The: *See*—
Citron, Irwin M.; and Kaszerman, Philip, 4,688,251, Cl. 380-34.000.

Singhdeo, Narendra N.; Pryor, Michael J.; Leedecke, Charles J.; and Masse, Norman G., to Olin Corporation. Method of manufacturing glass capacitors and resulting product. 4,687,540, Cl. 156-630.000.

Single Buoy Moorings Inc.: *See*—
Poldervaart, Leendert; Personnat, Jean C. M.; and Quinti, Roland P. O., 4,686,924, Cl. 114-219.000.

Sit-N-Sip, Inc.: *See*—
Bothun, Eugene L.; and Hine, Brent S., 4,687,122, Cl. 222-183.000.

Siuta, Vincent P., to Du Pont de Nemours, E. I., and Company. Copper conductor compositions. 4,687,597, Cl. 252-512.000.

Skaggs, Jerry W. Locking safety platform for a ladder. 4,687,075, Cl. 182-121.000.

Skalka, Gerald P.; and Skalka, Stanley H. Multi-position computer support. 4,687,167, Cl. 248-282.000.

Skalka, Stanley H.: *See*—
Skalka, Gerald P.; and Skalka, Stanley H., 4,687,167, Cl. 248-282.000.

Skelton, Delores J.: *See*—
Skelton, Maynard A.; and Skelton, Delores J., 4,686,958, Cl. 126-369.200.

Skelton, Lawrence. Method and apparatus for roofing. 4,686,809, Cl. 52-528.000.

Skelton, Maynard A.; and Skelton, Delores J. Versatile outdoor cooker. 4,686,958, Cl. 126-369.200.

SKF GmbH: *See*—
Kottwitz, Bernd; and Loser, Norbert, 4,687,347, Cl. 384-141.000.
Vogt, Gunter; and Winter, Heinrich, 4,687,350, Cl. 384-481.000.

SKF Steel Engineering AB: *See*—
Santen, Sven; and Johansson, Borje, 4,687,513, Cl. 75-88.000.

Skjerseth, Douglas N., to Seth Products, Inc. Adjustable multi-leaf table. 4,686,910, Cl. 108-153.000.

Skoet, Georg; and Guertler, Hanne, to Novo Industri A/S. Xylose isomerase (glucose isomerase) from *Streptomyces murinus* cluster. 4,687,742, Cl. 435-234.000.

Skolnik, Edward G.: *See*—
Heaton, Harley L., III; Lippold, Joseph H., Jr.; McHale, Edward T.; and Skolnik, Edward G., 4,687,490, Cl. 44-51.000.

SKW Trostberg Aktiengesellschaft: *See*—
Jekat, Herbert; Schutz, Erwin; and Stork, Kurt, 4,687,547, Cl. 159-3.000.

Slater Electric Inc.: *See*—
Freeman, LeRoy M., 4,688,133, Cl. 361-45.000.
Freeman, LeRoy M.; Gernhardt, Paul D.; and Orbeta, Ferdinand E., 4,688,134, Cl. 361-45.000.

Smaga, John A.: *See*—
Kaun, Thomas D.; and Smaga, John A., 4,687,717, Cl. 429-152.000.

Smith, David S., to Chevron Research Corporation. System for controlling solid transport. 4,687,382, Cl. 406-168.000.

Smith, Gordon M. Automatic valve actuator and control system. 4,687,179, Cl. 251-58.000.

Smith International, Inc.: *See*—
Smith, Richard D.; Oliver, Michael S.; Crouse, Richard D.; and Chia, Weng-Kwen R., 4,687,067, Cl. 175-340.000.

Smith, James W., to University of Toronto Innovations Foundation, The. Semi-fluidized bed. 4,686,723, Cl. 5-453.000.

Smith, Mark L., to AMP Incorporated. Apparatus for selectively plating electrical terminals. 4,687,555, Cl. 204-26.000.

Smith, Mark L.; and Wagner, Richard M., to AMP Incorporated. Anode assembly for selectively plating electrical terminals. 4,687,562, Cl. 204-206.000.

Smith, Michael E.: *See*—
Smith, Richard W., Jr.; and Smith, Michael E., 4,686,948, Cl. 123-193.00H.

Smith, Noel. Inflation pressure indicator for vehicle tires. 4,686,855, Cl. 73-146.800.

Smith, Randley A. Prefabricated panelized nuclear-hardened shelter. 4,686,804, Cl. 52-169.600.

Smith, Richard D.; Oliver, Michael S.; Crouse, Richard D.; and Chia, Weng-Kwen R., to Smith International, Inc. Crossflow rotary cone rock bit with extended nozzles. 4,687,067, Cl. 175-340.000.

Smith, Richard W., Jr.; and Smith, Michael E., to TFS, Inc. Head for high performance internal combustion engine. 4,686,948, Cl. 123-193.00H.

Smith, Ronald W.: *See*—
Harr, George B.; and Smith, Ronald W., 4,686,994, Cl. 128-586.000.

Smith, Sidney R.; and Siegel, Marvin I., to Schering Corporation. Method for suppressing the immune response. 4,687,774, Cl. 514-293.000.

Smith, Terry W. Recreational platform. 4,687,198, Cl. 272-114.000.

Smithies, Graham. Display device. 4,686,784, Cl. 40-406.000.

SmithKline Beckman Corporation: *See*—
Ali, Fadia E.; Huffman, William F.; Marshall, Garland R.; and Moore, Michael L., 4,687,758, Cl. 514-11.000.

Smolin, Martin; and Polovsky, Stuart B., to Amerchol Corporation. Esterified propoxylated glucose compositions. 4,687,843, Cl. 536-18.300.

SMS Schloemann-Siemag Aktiengesellschaft: *See*—
Svagr, Alexandr, 4,686,845, Cl. 72-238.000.

SMW Schneider & Weisshaupt GmbH: *See*—
Hiestand, Karl, 4,686,757, Cl. 29-568.000.

Smyth, Nicholas P. D.; and Stevens, Bernard J., to Smyth, Nicholas P. D. Method of operating pacemaker for detecting pacemaker-mediated tachycardia. 4,686,989, Cl. 128-419.0PG.

Snamprogetti, S.p.A.: *See*—
Taramasso, Marco, deceased; Notari, Bruno; Manara, Giovanni; and Bellussi, Giuseppe, 4,687,654, Cl. 423-329.000.

Snyder, Leon T.; Scarfone, Frank A.; Reuss, James L.; Campen, George V.; and Yates, George H., to Tri Fund Research Corporation. Multi-channel ventilation monitor and method. 4,686,999, Cl. 128-716.000.

Snyder, Warren E., to Dresser Industries, Inc. Method and apparatus for carburetion. 4,686,951, Cl. 123-527.000.

Sobel, Amos, to Elbit Computers Ltd. Electronic magnetic compass system. 4,686,772, Cl. 33-333.000.

Sobrevin Societe de brevets industriels-Etablissement: *See*—
Riva, Ermete, 4,687,149, Cl. 242-47.010.

Soderena, Soini: *See*—
Partanen, Paavo; and Soderena, Soini, 4,687,110, Cl. 212-147.000.

Soeffker, Eldred E.; and Rukavina, Lou. Modular carpet cleaning apparatus. 4,686,735, Cl. 15-320.000.

Sokol, Gary L.; Steen, Michael J.; and Stephen, Douglas A., to International Business Machines Corporation. Cartridge handling device and method. 4,688,123, Cl. 360-97.000.

Sola U.S.A. Inc.: *See*—
Lin, Shaow B.; Bowman, Lyle M.; Chandrasekaran, S. Kumar; and Harvey, Thomas B., III, 4,687,816, Cl. 525-279.000.
Petty, Dean M.; and Sage, Howard M., 4,686,798, Cl. 51-216.0LP.

Soled, Stuart L.: *See*—
Fiato, Rocco A.; Rice, Gary W.; Miseo, Sabato; and Soled, Stuart L., 4,687,753, Cl. 502-5.000.

Solomon, Frank; Grun, Charles; Abrahamson, Donald W.; Stewart, James J.; and Niksa, Marilyn J., to Eltech Systems Corporation. Unitized electrode-intercell connector module. 4,687,553, Cl. 204-16.000.

Someshwar, Ashok H.: *See*—
Eitrheim, John K.; and Someshwar, Ashok H., 4,687,959, Cl. 307-465.000.

Someya, Hiromi, to Canon Kabushiki Kaisha. Information setting device for camera. 4,687,308, Cl. 354-82.000.

Sommargren, Gary E., to Zygo Corporation. Apparatus to transform a single frequency, linearly polarized laser beam into a high efficiency beam with two, orthogonally polarized frequencies. 4,687,958, Cl. 307-425.000.

Son, Pyong-Nae; and Jacobs, Charles P., to B.F. Goodrich Company, The. Purification of 1-(2-amino-2-alkylpropyl)-3,3,5,5-tetraalkylpiperazinones. 4,687,850, Cl. 544-384.000.

Soni, Yogendra: *See—*
Casad, Burton M.; Soni, Yogendra; and Jurinak, Jeff J., 4,687,058, Cl. 166-263.000.

Sony Corporation: *See—*
Fukami, Tadashi; and Odaka, Kentaro, 4,688,225, Cl. 371-37.000.
Kani, Tetsuo, 4,688,111, Cl. 360-36.200.
Nagaura, Toru, 4,687,716, Cl. 429-145.000.
Nakagawa, Kenzo; and Suzuki, Masayuki, 4,688,206, Cl. 369-291.000.
Takahashi, Toshihiko; Inazawa, Yoshizumi; Tani, Toshiyuki; and Satomura, Shigeyuki, 4,688,115, Cl. 360-70.000.
Takahashi, Toshihiko; and Kawada, Hirohito, 4,688,116, Cl. 360-72.200.
Terayama, Yasunori; Nakamura, Masashi; Fujiie, Kazuhiko; and Yoshitoshi, You, 4,687,296, Cl. 350-247.000.

Sorg GmbH & Co. KG: *See—*
Pieper, Helmut; Knauer, Adolf; and Sorg, Helmut, 4,687,504, Cl. 65-326.000.

Sorg, Helmut: *See—*
Pieper, Helmut; Knauer, Adolf; and Sorg, Helmut, 4,687,504, Cl. 65-326.000.

Sotoyama, Kaoru; Sumida, Shizuo; and Kikuchi, Toshiyuki, to Mazda Motor Corporation. Lock up control of a hydraulic torque converter type automatic transmission. 4,687,083, Cl. 192-0.076.

Souriau & Cie: *See—*
Dubertret, Alain; Rizzo, Gilles; Bargain, Raymond; De Mendez, Michel; and Thenaisie, Jacky, 4,687,269, Cl. 439-161.000.

Southco, Inc.: *See—*
Bisbing, Robert H., 4,687,237, Cl. 292-78.000.

Southern Methodist University: *See—*
Meister, John J.; and Patil, Damodar R., 4,687,828, Cl. 527-400.000.

Spademan, Richard G. Multidirectional dynamic fitting system for a ski boot. 4,686,780, Cl. 36-121.000.

Spadini, Gianfranco L.: *See—*
Collins, Jerome H.; Mackey, Larry N.; and Spadini, Gianfranco L., 4,687,592, Cl. 252-99.000.

Spadotto, Oliviano: *See—*
Roman, Gianfranco; Da Rold, Claudio; and Spadotto, Oliviano, 4,686,729, Cl. 15-29.000.

Span America Medical Systems: *See—*
Mitchell, Charles B., 4,686,725, Cl. 5-481.000.

Sparkomatic Corporation: *See—*
Castagna, John F., 4,688,121, Cl. 360-94.000.

Sparks, Geoffrey S.: *See—*
Killoway, James M.; Stubbings, David J.; and Sparks, Geoffrey S., 4,688,261, Cl. 455-76.000.

Spector, Donald. Scratch and smell game. 4,687,203, Cl. 273-157.00R.

Speil, Walter, to Motomak Motorenbau, Maschinen-und Werkzeugfabrik, Konstruktionen GmbH. Hydraulic cup-shaped valve tappets. 4,686,947, Cl. 123-90.580.

Spencer, Malcolm: *See—*
Chown, David P. M.; and Spencer, Malcolm, 4,688,267, Cl. 455-619.000.

Sperry Corporation: *See—*
Cronson, Harry M.; and Ross, Gerald F., 4,688,041, Cl. 342-17.000.
Cronson, Harry M.; and Mara, Richard M., 4,688,042, Cl. 342-19.000.

Spilburg, Curtis A.; and Moore, William McC., to Monsanto Company. Peptide hydroxamic acid derivatives. 4,687,841, Cl. 530-331.000.

Spinner, Georg; Pitschi, Franz-Xaver; and Linnerbauer, Horst. Device for pressure sealed connection of the outer conductor of a coaxial line. 4,687,272, Cl. 439-271.000.

Spiva, Lowell E. Goggle mounting system. 4,686,712, Cl. 2-10.000.

Spranger, Gunther. Method and device for decreasing the flow resistance on wings particularly aerofoils and blades of turbomachines exposed to gas flux such as air. 4,687,416, Cl. 416-223.00A.

Springer, Joseph. Disposable lighter. 4,687,437, Cl. 431-277.000.

Sprinkel, Francis M., Jr.: *See—*
Houck, Willie G., Jr.; Sprinkel, Francis M., Jr.; Newsome, Reginald W.; Spruill, David B.; and Nichols, Walter A., 4,687,008, Cl. 131-335.000.

Spruill, David B.: *See—*
Houck, Willie G., Jr.; Sprinkel, Francis M., Jr.; Newsome, Reginald W.; Spruill, David B.; and Nichols, Walter A., 4,687,008, Cl. 131-335.000.

Sprunt, Eve S.; Humphreys, Neil V.; Muegge, Ernest L.; and Dixon, James R., Jr., to Mobil Oil Corporation. Method for determining lithological characteristics of a porous material. 4,688,238, Cl. 378-4.000.

SPS Technologies: *See—*
Wallace, Paul, 4,686,859, Cl. 73-761.000.

Spy-Mirrors, Inc.: *See—*
Harris, Richard J., Jr.; and Pickens, Frank D., 4,687,305, Cl. 350-624.000.

Square D Starkstrom GmbH: *See—*
Lemmer, Helmut; and Risthaus, Josef, 4,688,011, Cl. 335-159.000.

Sroog, Cyrus E., to Du Pont de Nemours, E. I., and Company. Process for drying polyimide film. 4,687,611, Cl. 264-236.000.

Staat der Nederlanden (Staatsbedrijf der Posterijen, Telegrafie en Telefonie): *See—*
Prins, Geert J., 4,687,106, Cl. 209-552.000.

Stafford, Gilbert A. Shell having pyramid shaped shot. 4,686,904, Cl. 102-439.000.

Stahl, Ulf: *See—*
Edholm, Thomas; and Stahl, Ulf, 4,687,105, Cl. 209-546.000.

Standard Elektrik Lorenz AG: *See—*
Uhlenkamp, Dirk, 4,688,089, Cl. 358-105.000.

Standard Oil Company, The: *See—*
Currie, Janie K.; Cooper, Arthur J.; and Pesa, Frederick A., 4,687,875, Cl. 585-469.000.

Stape, William J.; and Weber, Robert N., to AMP Incorporated. Duplex electro-fiber connector assembly. 4,687,291, Cl. 350-96.210.

Stark, Manfred: *See—*
Weiss, Franz; Eschenweck, Dieter; and Stark, Manfred, 4,687,043, Cl. 164-97.000.

Stauffer Chemical Company: *See—*
Paterson, Karol E.; and Everett, Nicholas P., 4,687,743, Cl. 435-240.490.
Sheyon, Gregory M.; and Aurichio, Joseph A., 4,687,693, Cl. 428-148.000.

Ste Look: *See—*
Bernard, Jean; and Mercier, Michel, 4,686,867, Cl. 74-534.600.

Stebleton, Leo F.: *See—*
Chaffee, Roger G.; and Stebleton, Leo F., 4,687,829, Cl. 528-17.000.

Steel Heddle Manufacturing Co.: *See—*
Faasse, Gene E., 4,687,030, Cl. 139-91.000.

Steen, Michael J.: *See—*
Sokol, Gary L.; Steen, Michael J.; and Stephen, Douglas A., 4,688,123, Cl. 360-97.000.

Steffes, Helmut: *See—*
Reinartz, Hans D.; and Steffes, Helmut, 4,687,259, Cl. 303-114.000.

Stein Associates, Inc.: *See—*
Ritz, Paul, 4,686,930, Cl. 118-24.000.

Stein Industrie: *See—*
Nicolas, Jacques; and Degrande, Gilbert, 4,686,844, Cl. 72-13.000.

Steinberg, Meyer: *See—*
Sundaram, Muthu S.; and Steinberg, Meyer, 4,687,570, Cl. 208-431.000.

Steinkirchner, John E.: *See—*
Cellier, Francis; Graulty, Robert T.; Johnson, Wendell L.; Batson, David M.; Limpert, John C.; Wu, Christopher K. C.; Bucher, George D.; John, Clarence D., Jr.; Steinkirchner, John E.; Larouere, Paula J.; Shah, Hemant H.; and Williams, Robert A., 4,687,605, Cl. 264-0.500.

Steinmetz, Alan L.; and Krinski, Thomas L., to Ralston Purina Company. Modified protein adhesive binder and process for producing. 4,687,826, Cl. 527-201.000.

Stellmacher, Wolfgang: *See—*
Arndt, Jentzsch; Schumann, Guenter; and Stellmacher, Wolfgang, 4,686,901, Cl. 101-148.000.

Stemmle, Denis J., to Xerox Corporation. Sorter and reciprocating stapler apparatus. 4,687,191, Cl. 270-53.000.

Stengelin, Ernst, to Klockner Ferromatik Desma GmbH. Mold press having a mold cleaning device. 4,687,431, Cl. 425-229.000.

Stepan Company: *See—*
Lietz, Dennis E.; and Whittern, Carleen C., 4,687,594, Cl. 252-352.000.

Stephen, Douglas A.: *See—*
Sokol, Gary L.; Steen, Michael J.; and Stephen, Douglas A., 4,688,123, Cl. 360-97.000.

Stephen, John F.: *See—*
Hartmann, Ludwig A.; and Stephen, John F., 4,687,854, Cl. 546-261.000.
Nelson, Richard V.; and Stephen, John F., 4,687,800, Cl. 524-103.000.

Stephenson, Brian D.: *See—*
Cosmos, Pete; Scully, Michael J.; and Stephenson, Brian D., 4,687,263, Cl. 439-108.000.

Stern, Leif E. Method of making brushes, and brushes thus made. 4,687,257, Cl. 300-21.000.

Stevens, Bernard J.: *See—*
Smyth, Nicholas P. D.; and Stevens, Bernard J., 4,686,989, Cl. 128-419.0PG.

Stevenson, George F., to Normalair-Garrett (Holdings) Limited. Flueric partial pressure sensor. 4,687,013, Cl. 137-7.000.

Stewart, Derrel N. Shield for automotive vehicle. 4,687,217, Cl. 280-153.00R.

Stewart, Harold S.; Hansen, Donald F.; and Turner, Vernon D., to United States of America, Air Force. Atmospheric Aerosol extinctiometer. 4,687,337, Cl. 356-437.000.

Stewart, Ian M.: *See—*
Keller, Paul R. N.; Gawley, Robin A.; and Stewart, Ian M., 4,688,106, Cl. 358-342.000.

Stewart, James J.: *See—*
Solomon, Frank; Grun, Charles; Abrahamson, Donald W.; Stewart, James J.; and Niksa, Marilyn J., 4,687,553, Cl. 204-16.000.

Stewart, Lawrence C.: *See—*
Rawson, Eric G.; and Stewart, Lawrence C., 4,687,284, Cl. 350-96.160.

Steyr-Daimler-Puch AG: *See—*
Aigner, Friedrich, 4,686,770, Cl. 33-257.000.

Sticht, Walter. Positioning and stop device for workpiece carriers of a conveyor. 4,687,091, Cl. 198-345.000.

Stillback, Ola, to AB Volvo. Combined handle and locking mechanism for a dashboard mounted apparatus such as a car radio. 4,687,172, Cl. 248-551.000.

Stirling, Hugh G.: *See*—
Cope, Richard E.; and Stirling, Hugh G., 4,687,065, Cl. 172-167.000.

Stockmaster, Edward F., to Babcock & Wilcox Company, The. Connector clip for ribbon cable connector. 4,687,276, Cl. 439-557.000.

Stofleth, David F.; and Muehlbauer, James H., to George Koch Sons, Inc. Spray booth with climate regulation system. 4,687,686, Cl. 427-421.000.

Stokoe, Philip T.; and Boulais, Dennis R., to Alco Electronic Products, Inc. Dual in-line package slide switch with detent assembly. 4,687,887, Cl. 200-16.00F.

Stoll, Kurt; and Hihn, Gerhard. Short stroke actuator. 4,687,189, Cl. 269-22.000.

Stoll, Kurt. Fluid power connector fittings. 4,687,235, Cl. 285-281.000.

Stoller, Herbert I.: *See*—
Kraus, Charles J.; Stoller, Herbert I.; and Wu, Leon L., 4,688,151, Cl. 361-405.000.

Stone, Gregory C.; Boggs, Steven A.; and Braun, Jean-Marie. Surge attenuating cable. 4,687,882, Cl. 174-102.0SC.

Stookey, Donald J., to Monsanto Company. Fluid separation membranes. 4,687,578, Cl. 210-321.100.

Stoppazzini, Benito, to E.M.M. Emiliana Macchine Maglieria S.R.L. Device for regulating the stitch density or automatic flat knitting machines. 4,686,838, Cl. 66-71.000.

Storage Technology Partners II: *See*—
Noyes, George I., Jr.; and Shah, Prabodh L., 4,688,204, Cl. 369-59.000.

Stork, Kurt: *See*—
Jekat, Herbert; Schutz, Erwin; and Stork, Kurt, 4,687,547, Cl. 159-3.000.

Storm Products Co.: *See*—
Holland, Brian J.; and Kotilinek, Mark P., 4,687,279, Cl. 439-578.000.

Stouffer Corporation, The: *See*—
Terauds, Oskar R., 4,687,117, Cl. 220-306.000.

Stouffer, Ronald D.; and Sulsky, Paul L., to Bowles Fluidics Corporation. Air distribution system. 4,686,890, Cl. 98-2.000.

Stout, Robert L., to Clinical Reference Laboratory, Inc. Biologic and method of preparing same. 4,687,665, Cl. 424-86.000.

Stromberg, Lars A., to Studsvik Energiteknik AB. Fast fluidized bed boiler and a method of controlling such a boiler. 4,686,939, Cl. 122-4.00D.

Stromswold, Chester E., to Sanders Associates, Inc. Feed-forward error correction for sandaps and other phase-locked loops. 4,688,003, Cl. 331-25.000.

Strugatz, Arthur. Method for casting polyester on glass mold. 4,687,609, Cl. 264-132.000.

Stubbings, David J.: *See*—
Killoway, James M.; Stubbings, David J.; and Sparks, Geoffrey S., 4,688,261, Cl. 455-76.000.

Stuck, Andrew G. Rotary boat repair apparatus. 4,686,925, Cl. 114-224.000.

Studsvik Energiteknik AB: *See*—
Stromberg, Lars A., 4,686,939, Cl. 122-4.00D.

Stumpp, Gerhard: *See*—
Buck, Rainer; Wessel, Wolf; and Stumpp, Gerhard, 4,686,830, Cl. 60-603.000.

Suchy, Milos: *See*—
Frater, Georg; Suchy, Milos; Wenger, Jean; and Winternitz, Paul, 4,687,849, Cl. 544-354.000.

Suciu, Gabriel L., to United Technologies Corporation. Low profile bearing support structure. 4,687,346, Cl. 384-99.000.

Suemitsu, Yuji: *See*—
Fujimura, Yoshihiko; Saitoh, Koichi; and Suemitsu, Yuji, 4,686,933, Cl. 118-623.000.

Sugai, Haruo: *See*—
Hashimoto, Koichi; Sugai, Haruo; Hara, Hikoyoshi; and Yamada, Norio, 4,686,967, Cl. 128-57.000.

Sugam, Richard J.; and Arnold, Herbert S. Method for the prediction and detection of condenser fouling. 4,686,853, Cl. 73-61.200.

Sugatsune Industrial Co., Ltd.: *See*—
Ishii, Hiroyuki, 4,686,740, Cl. 16-85.000.

Sugimori, Mitsuru: *See*—
Koga, Tadao; Sugimori, Mitsuru; Terasaki, Masanori; Maenosono, Tsukasa; Tsushima, Satoru; Yoshida, Kazuo; Kuriwaki, Tetsusho; and Hirado, Miharu, 4,687,894, Cl. 219-10.430.

Sugimoto, Masahiro: *See*—
Wakabayashi, Tetsushi; Sugimoto, Masahiro; and Muratake, Kiyoshi, 4,688,077, Cl. 357-81.000.

Sugisawa, Ko; Yamamoto, Masanori; Yasuda, Ataushi; Nomura, Yukihiro; and Amano, Toshio, to House Food Industries Co., Ltd. Method for treating aqueous solution of soybean protein with enzymes. 4,687,739, Cl. 435-69.000.

Sugita, Ryuji; Honda, Kazuyoshi; Nishida, Hiroshi; and Noda, Kyoji, to Matsushita Electric Industrial Co., Ltd. Vertical magnetic recording medium. 4,687,712, Cl. 428-611.000.

Suh, Nam P.; Saka, Nannaji; and Liou, Ming J., to Massachusetts Institute of Technology. Electrical contacts. 4,687,274, Cl. 439-426.000.

Sulsky, Paul L.: *See*—
Stouffer, Ronald D.; and Sulsky, Paul L., 4,686,890, Cl. 98-2.000.

Sulzer-Ruti Machinery Work Ltd.: *See*—
Fricker, Hans, 4,687,052, Cl. 165-82.000.

Sumida, Shizuo: *See*—
Sotoyama, Kaoru; Sumida, Shizuo; and Kikuchi, Toshiyuki, 4,687,083, Cl. 192-0.076.

Sumitomo Chemical Company: *See*—
Nakano, Kazuhiko; and Watanabe, Keiichirou, 4,687,675, Cl. 427-2.000.

Sumitomo Chemical Company, Limited: *See*—
Nakatsuka, Iwao; Shimizu, Hiroshi; and Yoshitake, Akira, 4,687,852, Cl. 546-20.000.
Okamoto, Akinori; Yamaguchi, Tetsuo; Okamura, Haruki; and Okino, Eizo, 4,687,756, Cl. 502-165.000.

Sumitomo Electric Industries, Ltd.: *See*—
Inoue, Nori; Moriai, Yasuharu; Sakatani, Atushi; and Yoshida, Noriyuki, 4,688,149, Cl. 361-399.000.

Sun Coast Plastics, Inc.: *See*—
Dutt, Herbert V.; and Santostasi, Paul A., 4,687,116, Cl. 220-270.000.

Sun Microsystems, Inc.: *See*—
Bechtolsheim, Andreas, 4,688,190, Cl. 364-900.000.

Sundaram, Muthu S.; and Steinberg, Meyer, to United States of America, Energy. Direct use of methane in coal liquefaction. 4,687,570, Cl. 208-431.000.

Sundman, Frey, to A. Ahlstrom Osakeyhtio. Apparatus for fiberizing and screening of fibrous materials. 4,687,146, Cl. 241-79.300.

Suokas, Elias U.: *See*—
Kari, Esko T.; Aaltonen, Jarmo; and Suokas, Elias U., 4,687,571, Cl. 209-167.000.

Superwave Technology, Inc.: *See*—
Chitre, Sanjeev R.; and Minaee, Behrooz, 4,687,895, Cl. 219-10.55A.

Supfina Maschinenfabrik Hentzen GmbH & Co.: *See*—
Weber, Robert; and Memmel, Anton, 4,686,794, Cl. 51-59.00R.

Suska, Charles R. Hinge incorporating leaf pads and tabs of uniform thickness. 4,686,743, Cl. 16-389.000.

Susko, John R.: *See*—
Burns, Francis C.; Dreyfus, Russell W.; and Susko, John R., 4,687,539, Cl. 156-626.000.

Sutter, Herbert G.: *See*—
Macedo, Pedro B.; Barkatt, Aaron; and Sutter, Herbert G., 4,687,581, Cl. 210-670.000.

Sutton, Robert F.; and Kirkham, Kathleen E., to Rockwell International Corporation. Preventing stress corrosion cracking of bearings. 4,687,556, Cl. 204-29.000.

Suyama, Tadakazu: *See*—
Fukushima, Tsunekazu; Emoto, Hiroshi; Kagitani, Yoshio; Yokoyama, Kazumasa; Nishida, Masayuki; and Suyama, Tadakazu, 4,687,762, Cl. 514-34.000.

Suzaki, Shunkichi; Shirai, Toshiaki; Adachi, Hisanobu; Hayashi, Masaharu; Hattori, Kenji; and Takakura, Yoshinari, to Toyota Jidosha Kabushiki Kaisha; and Aisin Seiki Kabushiki Kaisha. Engine cooling fan coupling system controlled in concert with a cooling system thermostat. 4,687,132, Cl. 236-35.000.

Suzuki, Akira; Mizuta, Yukio; Sato, Rejiro; and Shimizu, Kunio, to Kabushiki Kaisha Tokai. Light-shielding screen device. 4,688,156, Cl. 362-354.000.

Suzuki, Hayato: *See*—
Yamamoto, Hiroshi; Suzuki, Hayato; and Takatsuka, Keizo, 4,687,890, Cl. 200-148.00B.

Suzuki, Hiroyuki: *See*—
Tanimoto, Akikazu; Ishizaka, Shoji; Endo, Yutaka; Suzuki, Hiroyuki; and Yanagihara, Masamitsu, 4,687,322, Cl. 355-55.000.

Suzuki, Masayuki: *See*—
Nakagawa, Kenzo; and Suzuki, Masayuki, 4,688,206, Cl. 369-291.000.

Suzuki, Migaku; Sasaki, Satoshi; Mitsuno, Takashi; and Inagaki, Hiroyuki, to Uni-Charm Corporation. Disposable diaper and method for incorporation of elastic member into such diaper. 4,687,477, Cl. 604-385.00A.

Suzuki, Nobuhiko. Fabric currycomb. 4,686,731, Cl. 15-104.00A.

Suzuki, Nobuhiro, to Futaba Denshi Kogyo Kabushiki Kaisha. Motor control with radio control device. 4,687,975, Cl. 318-261.000.

Suzuki, Osamu; Ishizaki, Kanjiro; and Ozawa, Seiichi, deceased (by Ozawa, Yoshiko, heiress), to Chichibu Cement Co., Ltd.; and Ozawa Concrete Industry Co., Ltd. Process for producing a high integrity container. 4,687,614, Cl. 264-40.100.

Suzuki, Shigeru; Ohta, Masaki; and Takenaka, Kenji, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Variable angle wobble plate type compressor which maintains the crankcase pressure at a predetermined value. 4,687,419, Cl. 417-222.000.

Suzuki, Shinichi: *See*—
Kunugi, Yoshiro; Suzuki, Shinichi; and Kato, Masayuki, 4,688,258, Cl. 381-103.000.

Suzuki, Toshio: *See*—
Mutoh, Nobuyoshi; Sakai, Keijiro; Suzuki, Toshio; Ueda, Akiteru; Nandoh, Kenji; and Okajima, Ikuo, 4,688,162, Cl. 363-80.000.

Suzuki, Toshiro: *See*—
Takatori, Hiroshi; Suzuki, Toshiro; Matsubara, Osamu; and Yamada, Izuru, 4,687,998, Cl. 328-58.000.

Suzuki, Yasutoshi: *See*—
Itoh, Hiroshi; Suzuki, Yasutoshi; Fukada, Tsuyoshi; Ohmi, Shinya; and Hara, Kunihiko, 4,687,956, Cl. 307-310.000.

Suzuki, Yoji: *See*—
Ginnaga, Akihiro; Koba, Hiroshi; Sakuma, Shin; Kitagawa, Hisashi; Yamada, Akira; and Suzuki, Yoji, 4,687,738, Cl. 435-68.000.

Svagr, Alexandr, to SMS Schloemann-Siemag Aktiengesellschaft. Roll stand, with traveling carriage containing the set of rolls which can be run out of and back into said stand transversely to the direction of rolling. 4,686,845, Cl. 72-238.000.

Svesson, Bengt: *See*—
Larsson, Lars; and Svesson, Bengt, 4,687,197, Cl. 272-72.000.

Swart, Maarten E., to Revalidatie Institut Muiderpoort. Articulated bed with cellular air cushion mattress. 4,686,722, Cl. 5-453.000.

Swartzbaugh, Peter T., to Owens-Illinois, Inc. Child-resistant package. 4,687,112, Cl. 215-216.000.

Swift, Allan W., to E. J. Brooks Company. Security seal of the padlock type. 4,687,240, Cl. 292-320.000.

Swift, Harold: *See*—
Baseman, Maurice; and Swift, Harold, 4,687,634, Cl. 422-7.000.

Swiss Aluminium Ltd.: *See*—
Forster, Ludwig; Franke, Alois; and Nobel, Reinhard, 4,687,566, Cl. 204-279.000.

Sylling, Truman V.; and Allen, Stephen L. Method for desalination and rehabilitation of irrigated soil. 4,687,505, Cl. 71-27.000.

Syntex (U.S.A.) Inc.: *See*—
DiNello, Robert K.; Gibbons, Ian; and Ullman, Edwin F., 4,687,735, Cl. 435-7.000.

Szabo, Attila. Cartridge for frangible projectile. 4,686,905, Cl. 102-444.000.

Szego, Peter: *See*—
Fenyo, Marta; Kertesz, Ivan; Rozsa, Karoly; and Szego, Peter, 4,686,986, Cl. 128-396.000.

Szendroi, Balint; and Eriksson, Magnus, to Flygt AB. Attaching device. 4,687,175, Cl. 248-661.000.

Szobosszlai, Istvan; and Roucher, Christian, to ITT Composants et Instruments. Instrument plug locking device. 4,687,271, Cl. 439-350.000.

Tahara, Masato; Matsuura, Tooru; and Ryu, Toshihiko, to NEC Corporation. Cross-polarization interference canceller. 4,688,235, Cl. 375-102.000.

Tai, Henry T.; and Brown, Eric W., to I-Flow Corporation. Method for sequential intravenous infusion of multiple fluids. 4,687,475, Cl. 604-248.000.

Taisei Corporation: *See*—
Ito, Yasuro; Higuchi, Yoshiro; Shiki, Takeshi; Tsuji, Yukikazu; Tsuji, Masanori; and Hayakawa, Mitsutaka, 4,686,852, Cl. 73-61.00R.

Tait, David S.: *See*—
Kufta, George; and Tait, David S., 4,688,252, Cl. 381-4.000.

Takada, Hiroshi, to Murata Kikai Kabushiki Kaisha. Means for lifting motion of a heddle frame. 4,687,029, Cl. 139-84.000.

Takagi, Haruyuki; and Yonezawa, Takeshi, to Yokohama Rubber Co., Ltd., The. Method of reading concavo-convex bar code. 4,687,942, Cl. 250-556.000.

Takagi, Kazuhiko: *See*—
Igi, Hisashi; Ohta, Eiichi; Bandai, Yasuhito; and Takagi, Kazuhiko, 4,687,352, Cl. 400-73.000.

Takahashi, Hiroyoshi: *See*—
Ito, Makoto; Mori, Terumi; and Takahashi, Hiroyoshi, 4,686,879, Cl. 84-440.000.

Takahashi, Sachio: *See*—
Okazaki, Susumu; Higuchi, Shunichi; Nakamura, Osamu; and Takahashi, Sachio, 4,687,996, Cl. 324-436.000.

Takahashi, Sadatoshi; Kato, Masatake; and Tsuji, Sadahiko, to Canon Kabushiki Kaisha. Zoom lens system. 4,687,303, Cl. 350-427.000.

Takahashi, Shigeru: *See*—
Ibi, Akira; Sato, Takushi; Yamaguchi, Akihiro; Takahashi, Shigeru; Shishido, Shigeyuki; Tamai, Shoji; and Nakajima, Hisai, 4,687,836, Cl. 528-353.000.

Takahashi, Susumu, to Niigata Engineering Co., Ltd. Emergency release valve apparatus. 4,687,016, Cl. 137-240.000.

Takahashi, Toshihiko; Inazawa, Yoshizumi; Tani, Toshiyuki; and Satomura, Shigeyuki, to Sony Corporation. Apparatus for reproducing a digital signal. 4,688,115, Cl. 360-70.000.

Takahashi, Toshihiko; and Kawada, Hirohito, to Sony Corporation. Apparatus for recording and/or reproducing digital signal. 4,688,116, Cl. 360-72.200.

Takai, Hitoshi: *See*—
Ishino, Yuuji; Takai, Hitoshi; and Yoshida, Toshihiro, 4,686,895, Cl. 99-440.000.

Takai, Kazuki; Ito, Yukio; Kinoshita, Shigeo; Kikuchi, Junichi; and Fukazawa, Toshihiko, to Clarion Co., Ltd. Releasable connection arrangement of a loading and/or ejection mechanism in a tape player. 4,688,122, Cl. 360-96.500.

Takakura, Yoshinari: *See*—
Suzaki, Shunkichi; Shirai, Toshiaki; Adachi, Hisanobu; Hayashi, Masaharu; Hattori, Kenji; and Takakura, Yoshinari, 4,687,132, Cl. 236-35.000.

Takami, Akio: *See*—
Kojima, Takao; Nakano, Akira; Matsuura, Toshitaka; and Takami, Akio, 4,688,015, Cl. 338-34.000.

Takanashi, Nobuyasu, to Terumo Kabushiki Kaisha. Junction for medical instruments. 4,687,474, Cl. 604-257.000.

Takano, Kazukiyo: *See*—
Sato, Toru; Okazaki, Naoto; Hasegawa, Toshihisa; Fujii, Katsumasa; and Takano, Kazukiyo, 4,686,974, Cl. 128-204.230.

Takano, Masao: *See*—
Tamura, Kaoru; Takano, Masao; and Kimura, Tsutomu, 4,687,932, Cl. 250-327.200.

Takano, Yoshiya; Hoshi, Yoshikazu; Abe, Takao; and Tomozaki, Ryozoo, to Hitachi, Ltd. Fuel injection pump having sintered cam ring secured to body by bolt. 4,687,425, Cl. 417-462.000.

Takanoo, Miyako: *See*—
Kawakubo, Fumio; Takanoo, Miyako; Yukimoto, Sadao; and Isayama, Katsuhiko, 4,687,818, Cl. 525-404.000.

Takaoka, Yoshiyasu: *See*—
Sasao, Isamu; and Takaoka, Yoshiyasu, 4,687,142, Cl. 239-533.300.

Takasaki, Yoshimi: *See*—
Aagano, Toshitaka; and Takasaki, Yoshimi, 4,687,937, Cl. 250-484.100.

Takatori, Hiroshi; Suzuki, Toshiro; Matsubara, Osamu; and Yamada, Izuru, to Hitachi, Ltd. Pulse width generating circuit synchronized with clock signal and corresponding to a reference voltage. 4,687,998, Cl. 328-58.000.

Takatsuka, Keizo: *See*—
Yamamoto, Hiroshi; Suzuki, Hayato; and Takatsuka, Keizo, 4,687,890, Cl. 200-148.00B.

Takeda Chemical Industries, Ltd.: *See*—
Meguro, Kanji; and Fujita, Takeshi, 4,687,777, Cl. 514-342.000.
Moritaka, Shintaro, deceased; Watanabe, Yasuhiko; and Nishimura, Motoyuki, 4,687,669, Cl. 426-72.000.

Takeguchi, Shunsuke: *See*—
Urano, Shigeru; and Takeguchi, Shunsuke, 4,687,185, Cl. 266-274.000.

Takemae, Yoshihiro, to Fujitsu Limited. Semiconductor memory device having redundant memory and parity capabilities. 4,688,219, Cl. 371-10.000.

Takenaka, Kenji: *See*—
Suzuki, Shigeru; Ohta, Masaki; and Takenaka, Kenji, 4,687,419, Cl. 417-222.000.

Takeuchi, Mikio: *See*—
Hirano, Motoki; Takeuchi, Mikio; and Nakano, Kinichiro, 4,688,036, Cl. 340-825.690.

Talento, Joseph L., to General Electric Company. Vacuum interrupter contact. 4,687,515, Cl. 75-246.000.

Talmage, John E., Jr.; and Gibson, William A., to Elographics, Inc. Electrographic touch sensor with Z-axis capability. 4,687,885, Cl. 178-18.000.

Tam Ceramics, Inc.: *See*—
Wallace, Clarence L., 4,687,044, Cl. 164-100.000.

Tamai, Shoji: *See*—
Ibi, Akira; Sato, Takushi; Yamaguchi, Akihiro; Takahashi, Shigeru; Shishido, Shigeyuki; Tamai, Shoji; and Nakajima, Hisai, 4,687,836, Cl. 528-353.000.

Tamai, Yasuo: *See*—
Ogawa, Hiroshi; Saito, Shinji; Mizuno, Chiaki; and Tamai, Yasuo, 4,687,710, Cl. 428-447.000.

Tamoto, Koji: *See*—
Toyama, Tadao; Kobayashi, Kesanao; Koike, Mitsuru; and Tamoto, Koji, 4,687,727, Cl. 430-175.000.

Tams, Frederick J., III: *See*—
Hoffman, Dorothy M.; Tams, Frederick J., III; and McGinn, Joseph T., 4,687,537, Cl. 156-612.000.

Tamura, Hifumi; Yamamoto, Shigehiko; Shichi, Hiroyasu; and Ishitani, Toru, to Hitachi, Ltd. Ion beam apparatus. 4,687,930, Cl. 250-309.000.

Tamura, Hifumi; and Shichi, Hiroyasu, to Hitachi, Ltd. Ion source. 4,687,938, Cl. 250-423.00F.

Tamura, Kaoru; Takano, Masao; and Kimura, Tsutomu, to Fuji Photo Film Co., Ltd. Radiation image recording and read-out apparatus. 4,687,932, Cl. 250-327.200.

Tanabe, Toshiyuki; and Noguchi, Minoru, to Kabushiki Kaisha Toshiba. Reference signal reproduction apparatus. 4,688,094, Cl. 358-148.000.

Tanaka, Akira: *See*—
Fukuroi, Takeo; and Tanaka, Akira, 4,686,749, Cl. 24-691.000.

Tanaka, Isao: *See*—
Koishi, Toshio; Tanaka, Isao; Yasumura, Takashi; and Nishikawa, Yukitoshi, 4,687,295, Cl. 350-96.340.

Tanaka, Kazumi. Dot matrix printer head. 4,687,354, Cl. 400-121.000.

Tanaka, Kimio: *See*—
Shiba, Haruo; Sato, Takateru; Tanaka, Kimio; and Sakata, Yoshiya, 4,688,128, Cl. 360-132.000.

Tanaka, Masato; Irii, Shinsuke; and Shiozaki, Tomoharu, to Kanzaki Paper Manufacturing Company Limited. Pressure sensitive manifold paper. 4,688,060, Cl. 503-214.000.

Tanaka, Noriatsu: *See*—
Miyajima, Tamotsu; Tanaka, Noriatsu; and Saito, Nobuto, 4,687,791, Cl. 523-161.000.

Tanaka, Shinichi: *See*—
Mukai, Toshiharu; and Tanaka, Shinichi, 4,688,202, Cl. 369-44.000.

Tanaka, Tsunefumi: *See*—
Ikemori, Keiji; Tanaka, Tsunefumi; and Kato, Masatake, 4,687,302, Cl. 350-427.000.

Tani, Toshiyuki: *See*—
Takahashi, Toshihiko; Inazawa, Yoshizumi; Tani, Toshiyuki; and Satomura, Shigeyuki, 4,688,115, Cl. 360-70.000.

Tani, Yoshio: *See*—
Umeda, Tatsutoshi; Tani, Yoshio; Kaai, Takeshi; Nakano, Keiichi; and Izui, Yoshio, 4,686,946, Cl. 123-90.410.

Taniguchi, Akihiko: *See*—
Nakanishi, Yasushi; and Taniguchi, Akihiko, 4,687,320, Cl. 355-14.00R.

Taniguchi, Hiroshi; Tanizawa, Mitsumasa; and Ueno, Masatoshi, to Dainippon Screen Mfg. Co., Ltd. Apparatus for processing sensitive materials. 4,687,313, Cl. 354-320.000.

Taniguti, Ryosuke; Kohmo, Hidenori; Kubo, Manabu; and Ikeda, Takashi, to Mitsubishi Denki Kabushiki Kaisha. System for measuring three-dimensional coordinates. 4,688,184, Cl. 364-560.000.

Tanii, Junichi; Yamaki, Toshio; and Seigenji, Kiyoshi, to Minolta Camera Kabushiki Kaisha. Electrical connecting terminal. 4,687,266, Cl. 439-77.000.

Tanimoto, Akikazu; Ishizaka, Shoji; Endo, Yutaka; Suzuki, Hiroyuki; and Yanagihara, Masamitsu, to Nippon Kogaku K. K. Projection optical apparatus. 4,687,322, Cl. 355-55.000.

Tanizawa, Mitsumasa: *See*—
Taniguchi, Hiroshi; Tanizawa, Mitsumasa; and Ueno, Masatoshi, 4,687,313, Cl. 354-320.000.

Tanuma, Jiro: *See*—
Kikuchi, Hiroshi; Hayashi, Kuniharu; Isobe, Minoru; Tanuma, Jiro; and Maekawa, Masanori, 4,687,361, Cl. 400-322.000.

Tao, Frank, to CooperVision, Inc. Container with safety features for cleansing medical devices. 4,687,997, Cl. 324-439.000.

Taramasso, Marco, deceased (by Gatti, Irene, heir); Notari, Bruno; Manara, Giovanni; and Bellussi, Giuseppe, to Snamprogetti, S.p.A. Process for preparing ZSM-5, large pore mordenite and ZSM-35. 4,687,654, Cl. 423-329.000.

Tashiro, Ikuo: *See*—
Iwamoto, Katsuharu; Kawakami, Osamu; Miyagawa, Hideo; Tashiro, Ikuo; and Ishimura, Takiji, 4,687,927, Cl. 250-231.00P.

Task, Harry L.; and Genco, Louis V., to United States of America, Air Force. Method of measurement of haze in transparencies. 4,687,338, Cl. 356-446.000.

Tau Systems Corporation: *See*—
Waite, David P.; and Riddell, Horace G., 4,688,170, Cl. 364-200.000.

Taylor, Attalee S.: *See*—
Header, Stephen; Moore, Jerry L.; and Taylor, Attalee S., 4,687,267, Cl. 439-62.000.

TDK Corporation: *See*—
Shiba, Haruo; Sato, Takateru; Tanaka, Kimio; and Sakata, Yoshiya, 4,688,128, Cl. 360-132.000.

Teac Corporation: *See*—
Noda, Yasushi; Kitahara, Toshihiro; and Tsuyuguchi, Hiroshi, 4,688,131, Cl. 360-137.000.
Shoji, Makoto; Tsuyuguchi, Hiroshi; Toma, Shozo; Hiraki, Kazuhiro; and Morita, Tsutomu, 4,688,112, Cl. 360-60.000.

Tebbe, Gerhard, to Fichtel & Sachs AG. Torsional vibration damper. 4,687,087, Cl. 192-106.200.

Technological Research Association of Highly Reliable Marine Propulsion Plant: *See*—
Nagata, Osamu; Kajima, Takashi; and Ozaki, Toshiharu, 4,688,138, Cl. 361-154.000.
Nagata, Osamu; Kajima, Takashi; and Ozaki, Toshihara, 4,688,139, Cl. 361-154.000.

Technomare S.p.A.: *See*—
Beghetto, Leonardo; and Padovan, Giovanni, 4,687,062, Cl. 166-366.000.

Tegal Corporation: *See*—
Bowker, Christopher D., 4,687,543, Cl. 156-643.000.

Teijin Limited: *See*—
Ginnaga, Akihiro; Koba, Hiroshi; Sakuma, Shin; Kitagawa, Hisashi; Yamada, Akira; and Suzuki, Yoji, 4,687,738, Cl. 435-68.000.

Tektronix, Inc.: *See*—
Early, Stephen R.; and Grogan, Daniel, 4,687,552, Cl. 204-15.000.
Gumm, Linley F., 4,688,253, Cl. 381-7.000.
Mallory, Robert L.; Schamel, Alfred H.; and Sekel, Stephen M., 4,688,148, Cl. 361-395.000.

Telecommunications Radioelectriques et Telephoniques, TRT: *See*—
Loy, Fernand R., 4,687,933, Cl. 250-334.000.

Teleconference Systems, Inc.: *See*—
Cotton, Robert V.; and Klodnicki, Edward J., 4,688,108, Cl. 358-257.000.

Telex Computer Products, Inc.: *See*—
Parsons, Dale W., 4,688,113, Cl. 360-67.000.

Tenner, Thomas E., Jr.: *See*—
Pang, Peter K. T.; and Tenner, Thomas E., Jr., 4,687,840, Cl. 530-331.000.

Teramoto, Yoshikichi; Nakamura, Kenichi; and Murayama, Naohiro, to Kureha Kagaku Kogyo Kabushiki Kaisha. Dielectric films comprising stretched films of vinylidene fluoride and porcelain particles. 4,687,803, Cl. 524-413.000.

Terasaki, Masanori: *See*—
Koga, Tadao; Sugimori, Mitsuru; Terasaki, Masanori; Maenosono, Tsukasa; Tsushima, Satoru; Yoshida, Kazuo; Kuriwaki, Tetsusho; and Hirado, Miharu, 4,687,894, Cl. 219-10.430.

Terauds, Oskar R., to Stouffer Corporation, The. Frozen food package and cover lid. 4,687,117, Cl. 220-306.000.

Terayama, Yasunori; Nakamura, Masashi; Fujiie, Kazuhiko; and Yoshitoshi, You, to Sony Corporation. Optical pickup. 4,687,296, Cl. 350-247.000.

Terman, Lewis M.: *See*—
Lu, Nicky C.; Ning, Tak H.; and Terman, Lewis M., 4,688,063, Cl. 357-23.600.

Termet, Pierre. Cartridge loading and feeding arrangement for explosive charge operated device. 4,686,786, Cl. 42-1.120.

Terneu, Robert; and Roucour, Jean, to Glaverbel. Transparent glazing panels. 4,687,687, Cl. 428-34.000.

Terrian, Barbara C. Combination storm window and security system. 4,686,792, Cl. 49-61.000.

Terumo Kabushiki Kaisha: *See*—
Takanashi, Nobuyasu, 4,687,474, Cl. 604-257.000.

Tessler, Martin M.: *See*—
Trzasko, Peter T.; Tessler, Martin M.; Trksak, Ralph; and Jarowenko, Wadym, 4,687,519, Cl. 106-211.000.

Texace Corporation: *See*—
Coleman, Ann C.; and Garza, Irene E., 4,686,713, Cl. 2-12.000.

Texaco Inc.: *See*—
Warren, Wayne F.; Nussbaum, Theodore W.; Cox, Percy T.; and Johnson, Donald L., 4,687,995, Cl. 324-341.000.

Texas Instruments Incorporated: *See*—
Davis, Cecil J.; Matthews, Robert; and Hildenbrand, Randall C., 4,687,542, Cl. 156-643.000.
McElroy, David J., 4,687,951, Cl. 307-269.000.
Novak, Mark F.; Guttag, Karl M.; and Redwine, Donald J., 4,688,197, Cl. 365-230.000.
Peterson, Robert K., 4,688,150, Cl. 361-403.000.
Thompson, Craig W.; and Ross, Kenneth M., 4,688,195, Cl. 364-300.000.

Texas Tech University Health Sciences Center: *See*—
Pang, Peter K. T.; and Tenner, Thomas E., Jr., 4,687,840, Cl. 530-331.000.

Tezuka, Makoto: *See*—
Ogibayashi, Shigeaki; Yamada, Mamoru; Mukai, Tatsuo; Tezuka, Makoto; and Hirai, Masazumi, 4,687,047, Cl. 164-476.000.

TFS, Inc.: *See*—
Smith, Richard W., Jr.; and Smith, Michael E., 4,686,948, Cl. 123-193.00H.

Th. Goldschmidt AG: *See*—
Kollmeier, Hans-Joachim; and Langenhagen, Rolf-Dieter, 4,687,786, Cl. 521-110.000.

Thenaisie, Jacky: *See*—
Dubertret, Alain; Rizzo, Gilles; Bargain, Raymond; De Mendez, Michel; and Thenaisie, Jacky, 4,687,269, Cl. 439-161.000.

Thermal Science, Inc.: *See*—
Parker, John A.; Feldman, Rubin; and Bryant, Robert L., 4,687,651, Cl. 423-315.000.
Parker, John A.; Feldman, Rubin; and Bryant, Robert L., 4,687,785, Cl. 521-106.000.

Theta Industries, Inc.: *See*—
Raifalski, Karl-Heinz, 4,687,343, Cl. 374-56.000.

Thiessen, Albert R.: *See*—
Nuckolls, John H.; and Thiessen, Albert R., 4,687,618, Cl. 376-152.000.

Thoma, Christian H.; and Arnold, George D. M., to Unipat AG. Rotary hydrostatic radial piston machines. 4,686,829, Cl. 60-464.000.

Thomas, Claude: *See*—
Blineau, Joseph; Pommier, Daniel; and Thomas, Claude, 4,688,218, Cl. 370-106.000.

Thomas, James E. Plate holder. 4,687,169, Cl. 248-490.000.

Thomas, James L. Cradle type boat lifts. 4,686,920, Cl. 114-48.000.

Thomas, Johnnie. Handbag or backpack with a flap closure. 4,687,036, Cl. 150-118.000.

Thomas, Mammen; and Weinberg, Matthew, to Advanced Micro Devices, Inc. Method of making a planar polysilicon bipolar device. 4,686,763, Cl. 437-51.000.

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Davis, Harold L.; and Lee, Robert D., 4,687,989, Cl. 324-758.00R.

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Rischmueller, Klaus, 4,688,157, Cl. 363-20.000.

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Cullen, Paul R.; and Schroeder, Peter J., 4,687,244, Cl. 294-86.410.

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DiFrank, Frank J.; and Tipping, Mark R., 4,686,931, Cl. 118-50.000.

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Andra, Bryan K.; Funk, Kent D.; Lang, Clyde J.; and Todd, Philip, 4,686,820, Cl. 56-341.000.

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Inoue, Nori; Moriai, Yasuharu; Sakatani, Atushi; and Yoshida, Noriyuki, 4,688,149, Cl. 361-399.000.
Tokico Ltd.: *See*—
Inoue, Masaru; Ida, Masao; and Kohara, Takao, 4,686,863, Cl. 74-425.000.
Tokuyama, Yoshio, to Victor Company of Japan, Ltd. Drum servo circuit. 4,688,114, Cl. 360-70.000.
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Kinoshita, Hiroyuki; and Ono, Michihiro, 4,688,065, Cl. 357-23.130.
Saito, Mitsuo; Aikawa, Takeshi; and Mori, Akio, 4,688,032, Cl. 340-799.000.
Toma, Shozo: *See*—
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Tomizawa, Akimori, to Clarion Co., Ltd. Pay television system. 4,688,248, Cl. 380-20.000.
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Katsuragi, Koji; Ozaki, Hirofumi; Kawahara, Yoshihiro; Matsumoto, Hideki; Tomoe, Tetsuro; and Kobayashi, Kazuhiro, 4,687,357, Cl. 400-208.000.
Tomozaki, Ryozoo: *See*—
Takano, Yoshiya; Hoshi, Yoshikazu; Abe, Takao; and Tomozaki, Ryozoo, 4,687,425, Cl. 417-462.000.
Tong, Long S. Passive safety device for emergency steam dump and heat removal for steam generators in nuclear power reactors. 4,687,626, Cl. 376-298.000.
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Bruer, Dirk; Tooten, Karl-Heinz; and Freye, Theo, 4,686,812, Cl. 53-118.000.
Tork, Inc.: *See*—
Pitel, Ira J., 4,687,985, Cl. 323-323.000.
Toshiba Electronic Systems Co., Ltd.: *See*—
Odasima, Suzuo; Hida, Takao; and Mitamura, Mitsuru, 4,687,333, Cl. 356-382.000.
Toshiba Machine Co., Ltd.: *See*—
Odasima, Suzuo; Hida, Takao; and Mitamura, Mitsuru, 4,687,333, Cl. 356-382.000.
Toshiba Tungaloy Co., Ltd.: *See*—
Yokota, Yuzo; and Endo, Atsushi, 4,687,388, Cl. 408-230.000.
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Sato, Toru; Okazaki, Naoto; Hasegawa, Toshihisa; Fujii, Katsumasa; and Takano, Kazukiyo, 4,686,974, Cl. 128-204.230.
Touboul, Pierre L.: *See*—
Bernard, Alain M.; Canny, Jean-Paul L.; and Touboul, Pierre L., 4,688,141, Cl. 361-233.000.
Toulemonde, Francis: *See*—
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Touzin, Philippe: *See*—
Picciotto, Robert; Ramel, Francois; Rousseau, Alain; and Touzin, Philippe, 4,687,268, Cl. 439-55.000.
Towner, David K.; and Campbell, David K., to Hewlett-Packard Company. Focusing and tracking apparatus for an optical data storage device. 4,688,201, Cl. 369-44.000.
Toy, Lester T.; and Magay, Daniel, to Raychem Corporation. Heat activatable sealing piston. 4,687,280, Cl. 439-874.000.
Toyama, Tadao; Kobayashi, Kesanao; Koike, Mitsuru; and Tamoto, Koji, to Fuji Photo Film Co., Ltd. Light-sensitive planographic printing plate with layer of diazo resin containing photopolymerizable composition. 4,687,727, Cl. 430-175.000.
Toyo Seikan Kaisha, Ltd.: *See*—
Yazaki, Jinichi; and Sakano, Kozaburo, 4,687,689, Cl. 428-35.000.
Toyo Soda Manufacturing Co., Ltd.: *See*—
Arika, Junji; Igawa, Kazushige; and Itabashi, Keiji, 4,687,653, Cl. 423-329.000.
Toyoda Gosei Co., Ltd.: *See*—
Murakawa, Shoji, 4,686,750, Cl. 29-34.00R.
Toyota Jidosha Kabushiki Kaisha: *See*—
Matsui, Kazuma; Hattori, Yoshiyuki; Imani, Yuichi; Kuno, Akira; and Nomura, Yoshihisa, 4,687,260, Cl. 303-119.000.
Naruoka, Takao; Moriya, Yoshihito; and Ichimiya, Touru, 4,687,348, Cl. 384-255.000.
Suzaki, Shunkichi; Shirai, Toshiaki; Adachi, Hisanobu; Hayashi, Masaharu; Hattori, Kenji; and Takakura, Yoshinari, 4,687,132, Cl. 236-35.000.
Tracy, C. Edwin; Benson, David K.; and Ruth, Marta R., to United States of America, Energy. Method of synthesizing a plurality of reactants and producing thin films of electro-optically active transition metal oxides. 4,687,560, Cl. 204-164.000.
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Trewyn, Ronald W.; and D'Ambrosio, Steven M., to Ohio State University. Early cancer detection method. 4,687,733, Cl. 435-7.000.
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Snyder, Leon T.; Scarfone, Frank A.; Reuss, James L.; Campen, George V.; and Yates, George H., 4,686,999, Cl. 128-716.000.
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Ross, Richard S.; Friedman, John E.; and Friedman, James A., 4,687,248, Cl. 297-129.000.
Tri-Tech, Inc.: *See*—
Potts, Lanny L., 4,687,195, Cl. 272-69.000.
Triplett, Carol J., to Gray, John D.; and Triplett, Charles S. Roofing system, method and holddown apparatus. 4,686,808, Cl. 52-410.000.
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Triplett, Carol J., 4,686,808, Cl. 52-410.000.
Trksak, Ralph: *See*—
Trzasko, Peter T.; Tessler, Martin M.; Trksak, Ralph; and Jarowenko, Wadym, 4,687,519, Cl. 106-211.000.
Troncoso, Fernando, Jr. Rest device. 4,686,956, Cl. 124-41.00A.
Troutman, Dennis L.: *See*—
Hayes, John J.; and Troutman, Dennis L., 4,688,249, Cl. 380-20.000.
Troutner, Vernon H., to McNeilab, Inc. Zero insertion force socket for photoactivation patient treatment system. 4,687,464, Cl. 604-4.000.
Trzasko, Peter T.; Tessler, Martin M.; Trksak, Ralph; and Jarowenko, Wadym, to National Starch and Chemical Corporation. Paper size compositions. 4,687,519, Cl. 106-211.000.
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Tsao, Chein-Hwa S., to Xerox Corporation. Thermal transfer printing system. 4,688,050, Cl. 346-76.0PH.
Tsuji, Masanori: *See*—
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Tsuji, Nobuyuki: *See*—
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Matsui, Hirotoshi; Tsumura, Takeo; and Sakanaka, Eiichi, 4,687,356, Cl. 400-144.200.
Tsunekawa, Tokuichi; Sato, Yuichi; Kawabata, Takashi; and Matsumura, Susumu, to Canon Kabushiki Kaisha. Distance measuring device comprising a two sectioned sensor, each section having a plurality of sensing areas. 4,687,914, Cl. 250-201.000.
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Tsuru, Daisuke; Yoshimoto, Tadashi; Hagiwara, Hisao; and Kado, Kunio, to Kabushiki Kaisha Yakult Honsha. Anti-amnestic agent. 4,687,778, Cl. 514-419.000.
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Tsutsumi, Shigeru. Injection molding process for synthetic resin and its apparatus. 4,687,613, Cl. 264-328.150.
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Tu, Nan-Hsing. Segment connector for modular ladder. 4,687,076, Cl. 182-178.000.
Turner, Robert B.: *See*—
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Turner, Rudolf: *See*—
Eilers, Carl G.; Lee, Ronald B.; and Turner, Rudolf, 4,688,246, Cl. 380-9.000.
Turner, Vernon D.: *See*—
Stewart, Harold S.; Hansen, Donald F.; and Turner, Vernon D., 4,687,337, Cl. 356-437.000.
Twardowski, Zbylut J.; Nolph, Karl D.; and Khanna, Ramesh, to University of Missouri, Curators of the. Peritoneal dialysis catheter. 4,687,471, Cl. 604-175.000.
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Holmes, Richard E.; Mays, Joe A.; and Tyler, Michael C., 4,687,973, Cl. 315-371.000.
Uclaf, Roussel: *See*—
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Ueda, Akiteru: *See*—
Mutoh, Nobuyoshi; Sakai, Keijiro; Suzuki, Toshio; Ueda, Akiteru; Nandoh, Kenji; and Okajima, Ikuo, 4,688,162, Cl. 363-80.000.
Uematsu, Ryosuke; Ushioda, Toyoji; and Fukuchi, Hiromichi, to Nec Corporation. Drop-on-demand ink-jet printing apparatus. 4,688,048, Cl. 346-1.100.
Uemura, Sashiro; and Iwade, Motoo, to ISE Electronics Corporation. Fluorescent display device. 4,688,030, Cl. 340-781.000.
Ueno, Masatoshi: *See*—
Taniguchi, Hiroshi; Tanizawa, Mitsumasa; and Ueno, Masatoshi, 4,687,313, Cl. 354-320.000.
Ueyama, Seiji, to General Company Limited. Heat-sensitive transferring recording medium. 4,688,057, Cl. 503-204.000.
Ugai, Yasuhiro: *See*—
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Uhlenkamp, Dirk, to Standard Elektrik Lorenz AG. Circuit arrangement for detecting motion in a television picture. 4,688,089, Cl. 358-105.000.

Uhri, Duane C., to Mobil Oil Corporation. Stimulation of earth formations surrounding a deviated wellbore by sequential hydraulic fracturing. 4,687,061, Cl. 166-308.000.

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Harada, Susumu; Shimizu, Kiyoshi; and Ujiie, Masayuki, 4,687,817, Cl. 525-375.000.

Ulbrich, Paul. Electrode assembly for sensing heart activity. 4,686,996, Cl. 128-642.000.

Ullman, Edwin F.: *See—*
DiNello, Robert K.; Gibbons, Ian; and Ullman, Edwin F., 4,687,735, Cl. 435-7.000.

Umec Corporation: *See—*
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Umeda, Tatsutoshi; Tani, Yoshio; Kaai, Takeshi; Nakano, Keiichi; and Izui, Yoshio, to Kubota Limited. Valve moving system of an overhead valve engine. 4,686,946, Cl. 123-90.410.

Underwood, Larry B.: *See—*
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Unicell Limited: *See—*
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Union Carbide Corporation: *See—*
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Pellet, Regis J.; Best, Donald F.; Long, Gary N.; Rabo, Jule A.; and Wolynic, Edward T., 4,687,754, Cl. 502-65.000.

Union Oil Company of California: *See—*
Vauk, Dennis A., 4,686,775, Cl. 34-9.000.

Unipat AG: *See—*
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McWhirter, John G., 4,688,187, Cl. 364-825.000.

United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See—*
Restall, James E.; and Hayman, Cecil, 4,687,684, Cl. 427-248.100.

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Administrator National Aeronautics & Space Administration: *See—*
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Agriculture: *See—*
Farrell, Roberta L.; Kirk, Thomas K.; and Tien, Ming, 4,687,741, Cl. 435-189.000.
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Gross, Richard A., 4,687,281, Cl. 350-3.660.
Koshoffer, John M.; Pfefferle, Richard A.; and Larson, Harold A., 4,686,826, Cl. 60-261.000.
Morris, Robert K., 4,687,880, Cl. 136-246.000.
Oloff, Clarence M.; Hermann, Linda M.; Moss, William G.; and Sims, Steven R., 4,686,997, Cl. 128-653.000.
Stewart, Harold S.; Hansen, Donald F.; and Turner, Vernon D., 4,687,337, Cl. 356-437.000.
Task, Harry L.; and Genco, Louis V., 4,687,338, Cl. 356-446.000.
Yoldas, Bulent E.; and Partlow, Deborah P., 4,687,652, Cl. 423-327.000.
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Pistor, Helmut H., 4,687,886, Cl. 200-6.00B.
Rusche, Gerald A.; and Forsch, Henry A., 4,687,967, Cl. 313-477.00R.
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Blackburn, Robert S., 4,687,165, Cl. 248-274.000.
Blander, Milton; and Cook, Glenn M., 4,687,564, Cl. 204-243.00R.
Chaffin, Roger J.; and Osbourn, Gordon C., 4,688,068, Cl. 357-30.000.
Finch, Hilvan A., 4,687,990, Cl. 324-158.0MG.
Gruen, Dieter M.; Young, Charles E.; and Pellin, Michael J., 4,686,979, Cl. 128-303.100.
Hino, Toshiyuki; and Gorski, Anthony J., 4,686,833, Cl. 62-68.000.
Janos, Alan C.; Jardin, Stephen C.; and Yamada, Masaaki, 4,687,617, Cl. 376-137.000.
Kaun, Thomas D.; and Smaga, John A., 4,687,717, Cl. 429-152.000.
Kuchnir, Moyses; and Mills, Frederick E., 4,687,987, Cl. 324-71.300.
Liu, Kenneth C., 4,686,860, Cl. 73-856.000.
Moeller, Charles P., 4,687,616, Cl. 376-123.000.
Nuckolls, John H.; and Thiessen, Albert R., 4,687,618, Cl. 376-152.000.
Rehak, Pavel; and Gatti, Emilio, 4,688,067, Cl. 357-29.000.
Sundaram, Muthu S.; and Steinberg, Meyer, 4,687,570, Cl. 208-431.000.
Tracy, C. Edwin; Benson, David K.; and Ruth, Marta R., 4,687,560, Cl. 204-164.000.
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National Aeronautics and Space Administration: *See—*
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National Aeronautics & Space Administration: *See—*
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U.S. Philips Corporation: *See—*
Desperben, Lydie; Sari, Hikmet; and Moridi, Said, 4,687,999, Cl. 329-109.000.
Dijkmans, Eise C.; Raets, Joseph G. G.; and Philips, Norbert J. L., 4,688,001, Cl. 330-273.000.
Eizenhofer, Alfons; and Grauel, Christoph, 4,688,210, Cl. 370-18.000.
Hily, Claude E.; and Michel, Jacqueline-Madeleine, 4,687,285, Cl. 350-96.180.
Killoway, James M.; Stubbings, David J.; and Sparks, Geoffrey S., 4,688,261, Cl. 455-76.000.
Lemonier, Michel G.; and Petit, Maurice L. J., 4,687,922, Cl. 250-213.0VT.
Marinus, Antonius A. M., 4,688,159, Cl. 363-21.000.
Mateika, Werner D.; Laurien, Rolf; and Liehr, Manfred R., 4,687,646, Cl. 422-248.000.
Muller, Johannes C. A., 4,688,120, Cl. 360-85.000.
Pals, Jan A.; and Klinkhamer, Arend J., 4,686,759, Cl. 437-51.000.
Pelgrom, Marcellinus J. M., 4,688,220, Cl. 371-10.000.
Sanders, Rudolf; and van Seggelen, Godefridus G., 4,687,965, Cl. 313-318.000.
van der Staak, Caspert G. I.; and van de Ven, Johannes C., 4,688,093, Cl. 350-128.000.

United Technologies Corporation: *See—*
Capizzi, Anthony, Jr., 4,687,952, Cl. 307-261.000.
Carll, Richard T.; and Blackaby, Barry G., 4,688,183, Cl. 364-554.000.
Coburn, Robert E.; and Matthews, John A., 4,686,823, Cl. 60-39.320.
Kay, Bruce F., 4,687,691, Cl. 428-73.000.
Newman, Leon A.; and DeMaria, Anthony J., 4,688,228, Cl. 372-18.000.
Prario, Aldo, 4,687,413, Cl. 415-190.000.
Suciu, Gabriel L., 4,687,346, Cl. 384-99.000.

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Byers, Charles L.; Loeb, Gerald E.; Merzenich, Michael M.; and Rebscher, Stephen J., 4,686,765, Cl. 29-858.000.
Goodman, Murray; Marr-Leisy, Debra; Rosenkranz, Roberto P.; Melmon, Kenneth L.; and Verlander, Michael S., 4,687,873, Cl. 560-28.000.
Kerwin, James L.; and Washino, Robert K., 4,687,744, Cl. 435-242.000.

University of Connecticut Research & Development Corp.: *See—*
Waite, J. Herbert, 4,687,740, Cl. 435-69.000.

University of Glasgow, University Court of the: *See—*
Fisher, John; and Wheatley, David J., 4,687,483, Cl. 623-2.000.

University of Maryland: *See—*
Gokel, George W.; and Gatto, Vincent J., 4,687,844, Cl. 540-467.000.

University of Missouri, Curators of the: *See—*
Twardowski, Zbylut J.; Nolph, Karl D.; and Khanna, Ramesh, 4,687,471, Cl. 604-175.000.

University of Tennessee Research Corporation: *See—*
Deweese, Richard A., 4,687,154, Cl. 242-96.000.

University of Toronto Innovations Foundation, The: *See—*
Smith, James W., 4,686,723, Cl. 5-453.000.

University of Wales College of Medicine, The: *See—*
Newman, Goeffrey R.; Jasani, Bharat; and Williams, Edward D., 4,687,736, Cl. 435-7.000.

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Magenheim, Bertram; and Rocks, James K., 4,688,185, Cl. 364-563.000.

Uno, Takaaki, to Nissan Motor Co., Ltd. Four wheel steer system with fail-safe control. 4,687,214, Cl. 280-91.000.

UOP Inc.: *See—*
Greenwood, Arthur R., 4,687,637, Cl. 422-62.000.

Urano, Shigeru; and Takeguchi, Shunsuke, to Nippon Piston Ring Co., Ltd. Tool for supporting a composite camshaft during sintering. 4,687,185, Cl. 266-274.000.

Urata, Masami, to Kabushiki Kaisha Toshiba. Superconducting coil device. 4,688,137, Cl. 361-141.000.

Urbani, William G., to Industrial Innovations, Inc. Sludge remover and processor. 4,687,584, Cl. 210-769.000.

Ushioda, Toyoji: *See—*
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USM Corporation: *See—*
Hawkswell, Victor T., 4,687,152, Cl. 242-55.000.
Herdeg, Donald F.; and Ciccia, Lawrence P., 4,686,915, Cl. 112-121.120.

Utagawa, Ken: *See—*
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Vader, Scott J.: *See—*
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Fritsche, Karl; and Vahs, Wilhelm, 4,686,739, Cl. 16-79.000.

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Jaritz, Erich; and Krammer, Gunter, 4,686,877, Cl. 83-177.000.

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Victor Company of Japan, Limited: *See—*
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W. Haking Enterprises Limited: *See—*
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Brown, Ian A.; McMahon, Dennis R.; Rosas, Robin R.; Scopatz, Stephen D.; and Wind, Karen L., 4,687,107, Cl. 209-556.000.

Winful, Herbert G., to GTE Laboratories Incorporated. Methods of and apparatus for optical spatial scanning. 4,687,286, Cl. 350-96.190.

Wingate, Steven L. Audio power amplifier. 4,688,002, Cl. 330-298.000.

Winter, Heinrich: *See*—
Vogt, Gunter; and Winter, Heinrich, 4,687,350, Cl. 384-481.000.

Winternitz, Paul: *See*—
Frater, Georg; Suchy, Milos; Wenger, Jean; and Winternitz, Paul, 4,687,849, Cl. 544-354.000.

Winzer, Helmut: *See*—
Mumcu, Salih; and Winzer, Helmut, 4,687,838, Cl. 528-496.000.

Wiredal, Harry A. I.: *See*—
Eklof, Ake T.; and Wiredal, Harry A. I., 4,687,368, Cl. 403-343.000.

Wittwer, Alfred, to Ems-Inventia AG. Method of manufacturing a pole body for an electric fuse, pole body for an electric fuse and method of using the pole body. 4,686,903, Cl. 102-202.500.

Wober, Gunter: *See*—
Philapitsch, Anton; Wober, Gunter; Eibl, Johann; and Schwarz, Otto, 4,687,664, Cl. 424-85.000.

Wolcott, Dana W., to Eastman Kodak Company. Apparatus for producing a full resolution color photographic copy of a color video signal. 4,688,104, Cl. 358-332.000.

Wolfert, Gerhard: *See*—
Bohg, Armin; Fischer, Ludwig; Gantz, Bruno; Hartmann, Kurt; and Wolfert, Gerhard, 4,688,012, Cl. 335-276.000.

Wolff, George D.: *See*—
Fulkerson, David E.; and Geske, Marvin L., 4,687,994, Cl. 324-251.000.

Wolff, Richard H.: *See*—
Beveventano, Thomas; Rosen, Frank L.; Wolff, Richard H.; and Bendett, Raymond, 4,686,771, Cl. 33-324.000.

Wolynic, Edward T.: *See*—
Pellet, Regis J.; Best, Donald F.; Long, Gary N.; Rabo, Jule A.; and Wolynic, Edward T., 4,687,754, Cl. 502-65.000.

Wong, Brian W. Surgical articulator apparatus and method. 4,687,442, Cl. 433-63.000.

Wong, Man J. Water distiller. 4,687,550, Cl. 202-165.000.

Wong, Mon N.; and Linhardt, Wilbur J., to Hughes Aircraft Company. Phase compensated hybrid coupler. 4,688,006, Cl. 333-113.000.

Wong, Pui K., to Shell Oil Company. Hydrogenated block copolymers. 4,687,815, Cl. 525-271.000.

Woodard, Kenneth E., Jr.: *See*—
Justice, David D.; and Woodard, Kenneth E., Jr., 4,687,558, Cl. 204-59.00R.

Woollam, Ronald F.; and MacDougall, Maurice L., to Hawker Siddeley Canada, Inc. Low level freight car. 4,686,907, Cl. 105-4.100.

Wortel, Theodorus M.: *See*—
van der Vleugel, Dominicus J. M.; Hoving, Klaas; Wortel, Theodorus M.; Rosensweig, Ronald E.; and Rees, Lovat V. C., 4,687,878, Cl. 585-820.000.

Wreede, John E.; and Arns, James A., to Hughes Aircraft Company. Side lobe suppression in holograms using pre-exposure. 4,687,720, Cl. 430-2.000.

Wright, Charles G., to International Business Machines Corporation. Initialization apparatus for a data processing system with a plurality of input/output and storage controller connected to a common bus. 4,688,172, Cl. 364-200.000.

Wright, Richard F.; Adair, Paul C.; and Sanders, Frederick W., to Mead Corporation, The. Method for forming relief images and photosensitive material useful therein. 4,687,725, Cl. 430-138.000.

Wrobleski, David L.: *See*—
Leigh-Monstevens, Keith V.; Wrobleski, David L.; Nix, Richard A.; and Rei, Mark W., 4,687,084, Cl. 192-85.0CA.

Wu, Christopher K. C.: *See*—
Cellier, Francis; Graulty, Robert T.; Johnson, Wendell L.; Batson, David M.; Limpert, John C.; Wu, Christopher K. C.; Bucher, George D.; John, Clarence D., Jr.; Steinkirchner, John E.; Larouere, Paula J.; Shah, Hemant H.; and Williams, Robert A., 4,687,605, Cl. 264-0.500.

Wu, Leon L.: *See*—
Kraus, Charles J.; Stoller, Herbert I.; and Wu, Leon L., 4,688,151, Cl. 361-405.000.

Wu, Stephen H.; and Sandhu, Mohammad A., to Eastman Kodak Company. Rumen-stable pellets. 4,687,676, Cl. 427-3.000.

Wuethrich, Werner, to Autelca AG. Coin storage box and automatic teller. 4,687,089, Cl. 194-230.000.

Wurster, Helmut: *See*—
Ams, Felix; Bolg, Ulrich; and Wurster, Helmut, 4,688,087, Cl. 358-100.000.

Wurtman, Richard J., to Massachusetts Institute of Technology. Composition and method for increasing levels or release of brain serotonin. 4,687,763, Cl. 514-53.000.

Wyatt, W. Gerald; White, Richard L.; and Bleke, Jim, to VE Holding Corp. Method of and apparatus for particulate matter conditioning. 4,686,779, Cl. 34-168.000.

Xebec Development Partners, Ltd.: *See*—
Blessum, Norman S., 4,688,119, Cl. 360-77.000.

Xerox Corporation: *See*—
Appel, James J.; Costanza, Daniel W.; and Dastin, Richard M., 4,687,317, Cl. 355-3.00R.
Chow, Che C., 4,686,936, Cl. 118-661.000.
Crystal, Richard G.; and Gabor, Andrew, 4,686,900, Cl. 101-93.480.
Huggins, Raymond W., 4,687,925, Cl. 250-223.00R.
Mishra, Satchidanand, 4,687,319, Cl. 355-10.000.
Rawson, Eric G.; and Stewart, Lawrence C., 4,687,284, Cl. 350-96.160.
Stemmle, Denis J., 4,687,191, Cl. 270-53.000.
Tsao, Chein-Hwa S., 4,688,050, Cl. 346-76.0PH.

Yale University: *See*—
Ward, David C.; Leary, Jeffry J.; and Brigati, David J., 4,687,732, Cl. 435-6.000.

Yamada, Akira: *See*—
Ginnaga, Akihiro; Koba, Hiroshi; Sakuma, Shin; Kitagawa, Hisashi; Yamada, Akira; and Suzuki, Yoji, 4,687,738, Cl. 435-68.000.
Yamada, Atsushi: *See*—
Eguchi, Yoshio; and Yamada, Atsushi, 4,687,822, Cl. 526-265.000.
Yamada, Izuru: *See*—
Takatori, Hiroshi; Suzuki, Toshiro; Matsubara, Osamu; and Yamada, Izuru, 4,687,998, Cl. 328-58.000.
Yamada, Mamoru: *See*—
Ogibayashi, Shigeaki; Yamada, Mamoru; Mukai, Tatsuo; Tezuka, Makoto; and Hirai, Masazumi, 4,687,047, Cl. 164-476.000.
Yamada, Masaaki: *See*—
Janos, Alan C.; Jardin, Stephen C.; and Yamada, Masaaki, 4,687,617, Cl. 376-137.000.
Yamada, Norio: *See*—
Hashimoto, Koichi; Sugai, Haruo; Hara, Hikoyoshi; and Yamada, Norio, 4,686,967, Cl. 128-57.000.
Yamada, Osamu, to Citizen Watch Co., Ltd. Electrode structure of dot-matrix liquid-crystal cell having corresponding notches and slits. 4,687,299, Cl. 350-336.000.
Yamagishi, Nobuyuki: *See*—
Matsuo, Masashi; Yamagishi, Nobuyuki; Noshiro, Makoto; Jitsugiri, Yukio; and Ohnishi, Keiichi, 4,687,707, Cl. 428-336.000.
Yamaguchi, Akihiro: *See*—
Ibi, Akira; Sato, Takushi; Yamaguchi, Akihiro; Takahashi, Shigeru; Shishido, Shigeyuki; Tamai, Shoji; and Nakajima, Hisai, 4,687,836, Cl. 528-353.000.
Yamaguchi, Akira: *See*—
Ise, Yoji; Kanno, Teruo; and Yamaguchi, Akira, 4,687,021, Cl. 137-526.000.
Yamaguchi, Hiroshi: *See*—
Miyauchi, Tateoki; Yamaguchi, Hiroshi; Hongo, Mikio; Mizukoshi, Katsuro; Shimase, Akira; and Satoh, Ryohei, 4,687,939, Cl. 250-492.200.
Yamaguchi, Tetsuo: *See*—
Okamoto, Akinori; Yamaguchi, Tetsuo; Okamura, Haruki; and Okino, Eizo, 4,687,756, Cl. 502-165.000.
Yamaki, Toshio: *See*—
Tanii, Junichi; Yamaki, Toshio; and Seigenji, Kiyoshi, 4,687,266, Cl. 439-77.000.
Yamamoto, Hiroshi; Suzuki, Hayato; and Takatsuka, Keizo, to Mitsubishi Denki Kabushiki Kaisha. Gas insulated switchgear. 4,687,890, Cl. 200-148.00B.
Yamamoto, Hisashi: *See*—
Gotou, Tadashi; and Yamamoto, Hisashi, 4,687,318, Cl. 417-50.000.
Yamamoto, Makoto: *See*—
Kamikaseda, Takeshi; and Yamamoto, Makoto, 4,687,809, Cl. 525-57.000.
Yamamoto, Masanori: *See*—
Sugisawa, Ko; Yamamoto, Masanori; Yasuda, Ataushi; Nomura, Yukihiro; and Amano, Toshio, 4,687,739, Cl. 435-69.000.
Yamamoto, Nobuyuki: *See*—
Miyoshi, Takahito; Matsufuji, Akihiro; Yamamoto, Nobuyuki; Miyatsuka, Hajime; and Fujiyama, Masaaki, 4,687,704, Cl. 428-328.000.
Yamamoto, Shigehiko: *See*—
Tamura, Hifumi; Yamamoto, Shigehiko; Shichi, Hiroyasu; and Ishitani, Toru, 4,687,930, Cl. 250-309.000.
Yamamoto, Sigeyasu: *See*—
Hiraoka, Tetsuo; Hatamura, Koichi; and Yamamoto, Sigeyasu, 4,686,944, Cl. 123-52.0MV.
Yamamoto, Yuichi; Yoshida, Takashi; Fukatsu, Shunzo; and Ishimaru, Toshiyasu, to Meiji Seika Kaisha, Ltd. 3-(3,3,3-trifluoropropenyl) cephalosporins. 4,687,769, Cl. 514-202.000.
Yamaoka, Hiromasa; Okamoto, Tadashi; Iwasa, Yuzaburo; and Kimura, Kouichi, to Hitachi, Ltd. Bit processing utilizing a row and column ladder sequence. 4,688,193, Cl. 364-900.000.
Yamauchi, Hitoshi: *See*—
Kikuchi, Hiroshi; and Yamauchi, Hitoshi, 4,687,661, Cl. 424-38.000.
Yamauchi, Takao, to Mitsubishi Denki Kabushiki Kaisha. Gas insulated switchgear. 4,688,136, Cl. 361-120.000.
Yamauchi, Takashi: *See*—
Hiramatsu, Kenichi; Nozawa, Hidebumi; and Yamauchi, Takashi, 4,687,536, Cl. 156-556.000.
Yamazaki, Etuo, to Fanuc Ltd. Tracer control system. 4,688,179, Cl. 364-474.000.
Yamazaki, Shunpei, to Semiconductor Energy Laboratory Co., Ltd. Method of making photoelectric conversion device. 4,686,760, Cl. 437-5.000.
Yanagihara, Masamitsu: *See*—
Tanimoto, Akikazu; Ishizaka, Shoji; Endo, Yutaka; Suzuki, Hiroyuki; and Yanagihara, Masamitsu, 4,687,322, Cl. 355-55.000.
Yanase, Shozaburo, to Yanase Waitch K.K. Bag for containing flowable foodstuff. 4,686,814, Cl. 53-459.000.
Yanase Waitch K.K.: *See*—
Yanase, Shozaburo, 4,686,814, Cl. 53-459.000.
Yang, Tai-Her. Bench vise. 4,687,190, Cl. 269-239.000.
Yano, Kensaku: *See*—
Kon, Takao; Yano, Kensaku; Kakegawa, Masayuki; and Shibata, Hidenori, 4,688,098, Cl. 358-213.190.
Yasuda, Ataushi: *See*—
Sugisawa, Ko; Yamamoto, Masanori; Yasuda, Ataushi; Nomura, Yukihiro; and Amano, Toshio, 4,687,739, Cl. 435-69.000.
Yasuda, Hiroshi, to Kabushiki Kaisha Toshiba. Signal transmission circuit in a semiconductor integrated circuit. 4,687,949, Cl. 307-246.000.
Yasuda, Hiroshi; Ochii, Kiyofumi; and Masuoka, Fujio, to Kabushiki Kaisha Toshiba. CMOS hysteresis circuit with enable switch or natural transistor. 4,687,954, Cl. 307-279.000.
Yasuda, Tooru: *See*—
Nishiwaki, Mitsuo; Amano, Tooru; Yasuda, Tooru; Okubo, Sakae; and Mukawa, Naoki, 4,688,233, Cl. 375-58.000.
Yasuhara, Hiroshi: *See*—
Kaneko, Makoto; Ogura, Ichiro; Asahina, Hiroshi; and Yasuhara, Hiroshi, 4,688,175, Cl. 364-414.000.
Yasumura, Takashi: *See*—
Koishi, Toshio; Tanaka, Isao; Yasumura, Takashi; and Nishikawa, Yukitoshi, 4,687,295, Cl. 350-96.340.
Yasunaga, Makoto: *See*—
Ikehata, Tsutomu; Masuda, Katsuya; Yasunaga, Makoto; and Michioto, Takao, 4,687,355, Cl. 400-124.000.
Yasunaga, Satoshi, to NEC Corporation. Speech detector capable of avoiding an interruption by monitoring a variation of a spectrum of an input signal. 4,688,256, Cl. 381-46.000.
Yates, George H.: *See*—
Snyder, Leon T.; Scarfone, Frank A.; Reuss, James L.; Campen, George V.; and Yates, George H., 4,686,999, Cl. 128-716.000.
Yazaki, Jinichi; and Sakano, Kozaburo, to Toyo Seikan Kaisha, Ltd. Polyester vessel having improved dimension stability and process for preparation thereof. 4,687,689, Cl. 428-35.000.
Yazawa, Kazunaga: *See*—
Kawai, Yasuo; and Yazawa, Kazunaga, 4,687,764, Cl. 514-54.000.
Yokohama Rubber Co., Ltd., The: *See*—
Takagi, Haruyuki; and Yonezawa, Takeshi, 4,687,942, Cl. 250-556.000.
Yokota, Yuzo; and Endo, Atsushi, to Toshiba Tungaloy Co., Ltd. Drill bit. 4,687,388, Cl. 408-230.000.
Yokoyama, Kazumasa: *See*—
Fukushima, Tsunekazu; Emoto, Hiroshi; Kagitani, Yoshio; Yokoyama, Kazumasa; Nishida, Masayuki; and Suyama, Tadakazu, 4,687,762, Cl. 514-34.000.
Yoldas, Bulent E.; and Partlow, Deborah P., to United States of America, Air Force. Low temperature formation of mullite using silicon alkoxide and aluminum alkoxide. 4,687,652, Cl. 423-327.000.
Yonezawa, Takeshi: *See*—
Takagi, Haruyuki; and Yonezawa, Takeshi, 4,687,942, Cl. 250-556.000.
Yoshida, Kazuo: *See*—
Koga, Tadao; Sugimori, Mitsuru; Terasaki, Masanori; Maenosono, Tsukasa; Tsushima, Satoru; Yoshida, Kazuo; Kuriwaki, Tetsusho; and Hirado, Miharu, 4,687,894, Cl. 219-10.430.
Yoshida Kogyo K. K.: *See*—
Nagai, Yoshitaka; and Doguchi, Nobushige, 4,686,754, Cl. 29-418.000.
Yoshida Kogyo K.K.: *See*—
Fukuroi, Takeo; and Tanaka, Akira, 4,686,749, Cl. 24-691.000.
Yoshida, Noriyuki: *See*—
Inoue, Nori; Moriai, Yasuharu; Sakatani, Atushi; and Yoshida, Noriyuki, 4,688,149, Cl. 361-399.000.
Yoshida, Takashi: *See*—
Yamamoto, Yuichi; Yoshida, Takashi; Fukatsu, Shunzo; and Ishimaru, Toshiyasu, 4,687,769, Cl. 514-202.000.
Yoshida, Toshihiro: *See*—
Ishino, Yuuji; Takai, Hitoshi; and Yoshida, Toshihiro, 4,686,895, Cl. 99-440.000.
Yoshimoto, Makoto, to NEC Corporation. Channel quality monitoring apparatus. 4,688,207, Cl. 370-13.000.
Yoshimoto, Tadashi: *See*—
Tsuru, Daisuke; Yoshimoto, Tadashi; Hagiwara, Hisao; and Kado, Kunio, 4,687,778, Cl. 514-419.000.
Yoshimura, Hiroichi, to Fuji Techno Kogyo Kabushiki Kaisha. Constant volume pulsation-free reciprocating pump. 4,687,426, Cl. 417-539.000.
Yoshimura, Motokazu; Hirata, Koichi; and Kurebayashi, Kimie, to Brother Kogyo Kabushiki Kaisha. Electronic dictionary. 4,688,192, Cl. 364-900.000.
Yoshitake, Akira: *See*—
Nakatsuka, Iwao; Shimizu, Hiroshi; and Yoshitake, Akira, 4,687,852, Cl. 546-20.000.
Yoshitoshi, You: *See*—
Terayama, Yasunori; Nakamura, Masashi; Fujiie, Kazuhiko; and Yoshitoshi, You, 4,687,296, Cl. 350-247.000.
Young, Charles E.: *See*—
Gruen, Dieter M.; Young, Charles E.; and Pellin, Michael J., 4,686,979, Cl. 128-303.100.
Young, H. Gerald: *See*—
Petralia, Salvatore; and Young, H. Gerald, 4,686,736, Cl. 15-332.000.
Young, Harold R.: *See*—
Furrow, Roger W.; Young, Harold R.; and Dye, G. Frank, 4,687,033, Cl. 141-59.000.
Young, Kenneth P., to Alumax, Inc. Method of producing shaped metal parts. 4,687,042, Cl. 164-80.000.
Yu, Stella S. T.: *See*—
Adelstein, Gilbert W.; Moormann, Alan E.; and Yu, Stella S. T., 4,687,775, Cl. 514-300.000.
Yuchi, Tateo: *See*—
Miyafuji, Motohisa; Yuchi, Tateo; and Tsuno, Riichi, 4,687,633, Cl. 420-481.000.

Yui, Nobuhiko: *See*—
Ogata, Naoya; Sanui, Kohei; Yui, Nobuhiko; Nojima, Kazuhiko; Kataoka, Kazunori; Okano, Teruo; and Sakurai, Yasuhisa, 4,687,831, Cl. 528-64.000.
Yukimoto, Sadao: *See*—
Kawakubo, Fumio; Takanoo, Miyako; Yukimoto, Sadao; and Isayama, Katsuhiko, 4,687,818, Cl. 525-404.000.
Yunoki, Yutaka; and Nagasaki, Tatsuo, to Olympus Optical Co., Ltd. Endoscope pickup means. 4,686,964, Cl. 128-4.000.
Z-Lyften Produktion AB: *See*—
Lenfeldt, Lars, 4,687,082, Cl. 192-55.000.
Zahnradfabrik Friedrichshaffen AG: *See*—
Osterloff, Kurt; and Fuhrer, Gerd, 4,687,081, Cl. 192-53.00F.
Zapletal, Henry; Wentzek, Horst F.; and Chembakaffery, George M., to Leggett & Platt, Incorporated. Coil spring assembly machine. 4,686,753, Cl. 29-281.400.
Zatylny, Michael D. Carrier for cylindrical hay bales. 4,687,402, Cl. 414-24.600.
Zeigler, Thornton W., Jr.; Romanczuk, Chris S.; Betterton, Joseph T.; and Glover, Alfred H., to Chrysler Motors Corporation. Controlled PCV valve. 4,686,952, Cl. 123-572.000.
Zeilstra, Jacobus J.; and Brink, Ted, to Akzo nv. Copolyetherester based on poly (propylene oxide) glycol blocked with ethylene oxide. 4,687,835, Cl. 528-300.000.
Zeller+Gmelin GmbH & Co.: *See*—
Seng, Hans-Peter, 4,687,520, Cl. 106-271.000.
Zemp, Georg, to Contraves AG. Temperature regulating device for a laboratory reaction vessel arrangement. 4,687,051, Cl. 165-61.000.
Zenex Corporation: *See*—
Zenkich, Ilias R., 4,687,004, Cl. 128-798.000.
Zenith Electronics Corporation: *See*—
Eilers, Carl G.; Lee, Ronald B.; and Turner, Rudolf, 4,688,246, Cl. 380-9.000.
Fendley, James R., 4,688,079, Cl. 358-10.000.
Kufta, George; and Tait, David S., 4,688,252, Cl. 381-4.000.
Ray, Francis M., 4,687,092, Cl. 198-461.000.
Zenkich, Ilias R., to Zenex Corporation. Dual element electrical connector. 4,687,004, Cl. 128-798.000.
Zils, James A.; and Markovic, Radoslav, to RB & W Corporation. Method and apparatus for loading articles. 4,686,815, Cl. 53-469.000.
Zimmerman, Danny. Thermostatically controlled electrically heated soldering bit. 4,687,903, Cl. 219-241.000.
Zimmerman, Harry M. Pipe slip joint system. 4,687,232, Cl. 285-31.000.
Zupanick, Joseph E.; and Braun, Clarence, to Atlantic Richfield Company. Temperature compensation means for a radiometer. 4,687,335, Cl. 356-416.000.
Zweegers, Petrus W. Mowing machine. 4,686,818, Cl. 56-192.000.
Zwolinski, Leon M.; and Dwyer, Frank J., to Allied Corporation. Foaming system for phenolic foams. 4,687,787, Cl. 521-131.000.
Zygo Corporation: *See*—
Sommargren, Gary E., 4,687,958, Cl. 307-425.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 18TH DAY OF AUGUST, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Bohme, Rolf, to Telefunken electronic GmbH. Feedback amplifier or threshold value switch for a current feed differential stage. Re. 32,479, Cl. 330-261.000.

Bolan, Patrick J. Electronic bingo player. Re. 32,480, Cl. 364-410.000.

Gotou, Kanzen, to Hitachi, Ltd. Transaction processing system. Re. 32,478, Cl. 235-379.000.

Hitachi, Ltd.: *See*—
Gotou, Kanzen, Re. 32,478, Cl. 235-379.000.
Nishida, Shigeo; Kawakami, Shojiro; Ohtaka, Yoichi; and Onoda, Seiichi, Re. 32,475, Cl. 350-96.330.

Kawakami, Shojiro: *See*—
Nishida, Shigeo; Kawakami, Shojiro; Ohtaka, Yoichi; and Onoda, Seiichi, Re. 32,475, Cl. 350-96.330.

Kistner, John F., to Minnesota Mining and Manufacturing Company. Consolidation of aggregate material. Re. 32,476, Cl. 405-264.000.

Koos, Inc.: *See*—
McConnell, Forrest M., Re. 32,477, Cl. 252-70.000.

McConnell, Forrest M., to Koos, Inc. Ice melter and method of making same. Re. 32,477, Cl. 252-70.000.

Minnesota Mining and Manufacturing Company: *See*—
Kistner, John F., Re. 32,476, Cl. 405-264.000.

Nishida, Shigeo; Kawakami, Shojiro; Ohtaka, Yoichi; and Onoda, Seiichi, to Hitachi, Ltd. Optical waveguide transmitting light wave energy in single mode. Re. 32,475, Cl. 350-96.330.

Ohtaka, Yoichi: *See*—
Nishida, Shigeo; Kawakami, Shojiro; Ohtaka, Yoichi; and Onoda, Seiichi, Re. 32,475, Cl. 350-96.330.

Onoda, Seiichi: *See*—
Nishida, Shigeo; Kawakami, Shojiro; Ohtaka, Yoichi; and Onoda, Seiichi, Re. 32,475, Cl. 350-96.330.

Telefunken electronic GmbH: *See*—
Bohme, Rolf, Re. 32,479, Cl. 330-261.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Alpha Industries, Inc.: *See*—
Borzym, Alexander, B1 4,108,029, Cl. 83-54.000.

Bargain, Michel; and Millet, Claude, to Rhone-Poulenc Industries. Polymerization of organopolysiloxanes. B1 4,138,543, 8-18-87, Cl. 528-14.000.

Borzym, Alexander, to Alpha Industries, Inc. Cut-off die set. B1 4,108,029, 8-18-87, Cl. 83-54.000.

Brooks, Harry F.: *See*—
Malizio, Andrew B.; Rice, Martin A.; and Brooks, Harry F., B1 3,905,809, Cl. 420-578.000.

Debor, Harald H. A., to S. W. Hooper & Company, Ltd. Discharger mechanism. B1 4,157,761, 8-18-87, Cl. 414-304.000.

Deutsch, Ralph, to North American Rockwell Corporation. Digital organ. B1 3,515,792, 8-18-87, Cl. 84-1.030.

Goode, Richard L., to Innovative Hearing Corporation. Ear acoustical hearing aid. B1 4,556,122, 8-18-87, Cl. 181-136.000.

Innovative Hearing Corporation: *See*—
Goode, Richard L., B1 4,556,122, Cl. 181-136.000.

International Business Machines Corporation: *See*—
Queener, Carl A., B1 3,647,293, Cl. 355-15.000.

Kurt, Pauker: *See*—
Voland, Elmo W.; Simmons, Harold T.; and Kurt, Pauker, B1 3,727,015, Cl. 200-38.00R.

Malizio, Andrew B.; Rice, Martin A.; and Brooks, Harry F., to United States Pipe and Foundry Company. Alloy for making ductile iron. B1 3,905,809, 8-18-87, Cl. 420-578.000.

Millet, Claude: *See*—
Bargain, Michel; and Millet, Claude, B1 4,138,543, Cl. 528-14.000.

North American Rockwell Corporation: *See*—
Deutsch, Ralph, B1 3,515,792, Cl. 84-1.030.

P. R. Mallory & Co., Inc.: *See*—
Voland, Elmo W.; Simmons, Harold T.; and Kurt, Pauker, B1 3,727,015, Cl. 200-38.00R.

Queener, Carl A., to International Business Machines Corporation. Copying system featuring combined developing-cleaning station alternately activated. B1 3,647,293, 8-18-87, Cl. 355-15.000.

Rhone-Poulenc Industries: *See*—
Bargain, Michel; and Millet, Claude, B1 4,138,543, Cl. 528-14.000.

Rice, Martin A.: *See*—
Malizio, Andrew B.; Rice, Martin A.; and Brooks, Harry F., B1 3,905,809, Cl. 420-578.000.

S. W. Hooper & Company, Ltd.: *See*—
Debor, Harald H. A., B1 4,157,761, Cl. 414-304.000.

Simmons, Harold T.: *See*—
Voland, Elmo W.; Simmons, Harold T.; and Kurt, Pauker, B1 3,727,015, Cl. 200-38.00R.

United States Pipe and Foundry Company: *See*—
Malizio, Andrew B.; Rice, Martin A.; and Brooks, Harry F., B1 3,905,809, Cl. 420-578.000.

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Ciaffone, John T., to Warner-Lambert Company. Safety razor cartridge. 291,495, 8-18-87, Cl. D28-47.000.
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Delmas, Jacques, to Etudes Techniques et Representations Industrielles ETRI. Industrial fan. 291,488, 8-18-87, Cl. D23-162.000.
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Lee, Peter. Telephone. 291,437, 8-18-87, Cl. D14-53.000.

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Noyce, John B., to Manufacturer's Merchandising Corporation. Baluster. 291,492, 8-18-87, Cl. D25-77.000.

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Oord, Klaas T., to U.S. Philips Corporation. Dry shaver. 291,497, 8-18-87, Cl. D28-50.000.

Oord, Klaas T., to U.S. Philips Corporation. Dry shaver. 291,498, 8-18-87, Cl. D28-50.000.

Oord, Klaas T., to U.S. Philips Corporation. Dry shaver. 291,499, 8-18-87, Cl. D28-50.000.

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Tasca International Ltd.: *See*—
Yoshiharu, Takei, 291,440, Cl. D14-64.000.
Taube, Ernest C. Pool cue bridge. 291,466, 8-18-87, Cl. D21-232.000.
Themistos, John H.; and Brady, William P., to Secure-it Inc. Hinged fastener. 291,409, 8-18-87, Cl. D8-382.000.
TIE/communications, Inc.: *See*—
Brown, Wilbert C.; Tosto, Roger J.; and Babbitt, Eric K., 291,436, Cl. D14-53.000.
Tokyo Denshi Kagaku Co., Ltd.: *See*—
Uehara, Akira; Hijikata, Isamu; Nakane, Hisashi; and Nakayama, Muneo, 291,413, Cl. D9-367.000.
Tomchak, Sigfrid A.: *See*—
Padilla, James M.; and Tomchak, Sigfrid A., 291,479, Cl. D23-43.000.
Tosto, Roger J.: *See*—
Brown, Wilbert C.; Tosto, Roger J.; and Babbitt, Eric K., 291,436, Cl. D14-53.000.
'totes', incorporated: *See*—
Selig, Julie A., 291,385, Cl. D3-12.000.
Triumph-Adler A.G.: *See*—
Gubbe, Bernd; and Krause, Klaus-Diether, 291,450, Cl. D18-7.000.
Tsumurai, Yasuo: *See*—
Kouno, Shuichi; Sakae, Hideki; Yanagisawa, Kazunori; and Tsumurai, Yasuo, 291,486, Cl. D23-155.000.
Tsunetsugu, Toru: *See*—
Kawano, Kazuhiko; and Tsunetsugu, Toru, 291,435, Cl. D14-52.000.
Tunturipyora OY: *See*—
Aalto, Aimo, 291,462, Cl. D21-194.000.
Uehara, Akira; Hijikata, Isamu; Nakane, Hisashi; and Nakayama, Muneo, to Tokyo Denshi Kagaku Co., Ltd. Wafer holding frame. 291,413, 8-18-87, Cl. D9-367.000.
Unger, Steve A., to Syracuse China Corporation. Saucer or similar article. 291,397, 8-18-87, Cl. D7-23.000.
U.S. Philips Corporation: *See*—
Oord, Klaas T., 291,496, Cl. D28-50.000.
Oord, Klaas T., 291,497, Cl. D28-50.000.
Oord, Klaas T., 291,498, Cl. D28-50.000.
Oord, Klaas T., 291,499, Cl. D28-50.000.
Vaccaro, Giuseppe, to Bata-Schuh AG. Sandal. 291,382, 8-18-87, Cl. D2-292.000.
Valls, Jose E.: *See*—
Vassallo, Efrain D.; and Valls, Jose E., 291,480, Cl. D23-45.000.
Vassallo, Efrain D.; and Valls, Jose E., 291,481, Cl. D23-43.000.
Vassallo, Efrain D.; and Valls, Jose E., 291,482, Cl. D23-45.000.
Vassallo, Efrain D.; and Valls, Jose E., 291,483, Cl. D23-45.000.
Van Wilson, Marlin. Combined mast assembly with yarn tension and cutter gate and threading hook units for creels. 291,446, 8-18-87, Cl. D15-78.000.
Vartanian, Armand; and LeFevre, Ronald G. Automobile window shade. 291,430, 8-18-87, Cl. D12-191.000.
Vassallo, Efrain D.; and Valls, Jose E., to Vassallo Research and Development Corporation. Tee pipe fitting. 291,480, 8-18-87, Cl. D23-45.000.
Vassallo, Efrain D.; and Valls, Jose E., to Vassallo Research and Development Corporation. Elbow pipe fitting. 291,481, 8-18-87, Cl. D23-43.000.
Vassallo, Efrain D.; and Valls, Jose E., to Vassallo Research and Development Corporation. Pipe coupling. 291,482, 8-18-87, Cl. D23-45.000.
Vassallo, Efrain D.; and Valls, Jose E., to Vassallo Research and Development Corporation. Cross tee pipe fitting. 291,483, 8-18-87, Cl. D23-45.000.
Vassallo Research and Development Corporation: *See*—
Vassallo, Efrain D.; and Valls, Jose E., 291,480, Cl. D23-45.000.
Vassallo, Efrain D.; and Valls, Jose E., 291,481, Cl. D23-43.000.
Vassallo, Efrain D.; and Valls, Jose E., 291,482, Cl. D23-45.000.
Vassallo, Efrain D.; and Valls, Jose E., 291,483, Cl. D23-45.000.
Vermont American Corporation: *See*—
Rosenberg, Abraham, 291,403, Cl. D8-83.000.
W. A. Deutsher Pty. Ltd.: *See*—
Lance, Mark A., 291,421, Cl. D10-119.000.
Warner-Lambert Company: *See*—
Ciaffone, John T., 291,495, Cl. D28-47.000.
Webb, Judy D. Jewelry pendant. 291,425, 8-18-87, Cl. D11-83.000.
Whitley, Tom A. Putter head. 291,464, 8-18-87, Cl. D21-219.000.
Worksaver, Inc.: *See*—
Burenga, Thomas I., 291,445, Cl. D15-28.000.
Worthen, Ken. Dispensing box for denture cleansing tablets. 291,392, 8-18-87, Cl. D6-440.000.
Wright, Philip W.: *See*—
Schaller, Ronald A.; Steffensen, Wesley L.; and Wright, Philip W., 291,427, Cl. D12-10.000.
Wu, Richard. Telephone set. 291,439, 8-18-87, Cl. D14-53.000.
Yagi, Masaru, to Kitagawa Industries Co., Ltd. Hinge. 291,407, 8-18-87, Cl. D8-325.000.
Yaguchi, Tadahiro, to Honda Giken Kogyo Kabushiki Kaisha. Power generator. 291,432, 8-18-87, Cl. D13-2.000.
Yamaguchi, Kaname, to Daiwa Seiko, Inc. Fishing reel spool. 291,471, 8-18-87, Cl. D22-137.000.
Yanagisawa, Kazunori: *See*—
Kouno, Shuichi; Sakae, Hideki; Yanagisawa, Kazunori; and Tsumurai, Yasuo, 291,486, Cl. D23-155.000.
Yoshiharu, Takei, to Tasca International Ltd. Handset telephone. 291,440, 8-18-87, Cl. D14-64.000.
Yoshikawa, Masao: *See*—
Nishiyori, Hiroaki; Momota, Nobuo; Yoshikawa, Masao; Sai, Akishige; and Masunari, Kazutoshi, 291,441, Cl. D14-77.000.
579874 Ontario Inc.: *See*—
Lajoie, Ivan I., 291,423, Cl. D11-26.000.

CLASSIFICATION OF PATENTS

ISSUED AUGUST 18, 1987

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

2	4,686,710
8	4,686,711
10	4,686,712
12	4,686,713
105	4,686,714
114	4,686,715
152 R	4,686,716

CLASS 4

502	4,686,717
508	4,686,718

CLASS 5

81 R	4,686,719
121	4,686,720
451	4,686,721
453	4,686,722
	4,686,723
468	4,686,724
481	4,686,725
485	4,686,726
503	4,686,727

CLASS 8

506	4,687,489

CLASS 15

1.7	4,686,728
29	4,686,729
93 R	4,686,730
104 A	4,686,731
104.3 SN	4,686,732
250.16	4,686,733
257.1	4,686,734
320	4,686,735
332	4,686,736
415 R	4,686,737

CLASS 16

2	4,686,738
79	4,686,739
85	4,686,740
112	4,686,741
	4,686,742
389	4,686,743

CLASS 19

200	4,686,744

CLASS 24

17 B	4,686,745
116 R	4,686,746
274 R	4,686,747
522	4,686,748
691	4,686,749

CLASS 29

1.32	4,686,751
34 R	4,686,750
163.5 R	4,686,752
281.4	4,686,753
418	4,686,754
450	4,686,755
463	4,686,756
568	4,686,757
592	4,686,764
858	4,686,765
883	4,686,766

CLASS 30

134	4,686,767

CLASS 33

172 B	4,686,768
197	4,686,769
257	4,686,770
324	4,686,771
333	4,686,772
367	4,686,773

CLASS 34

9	4,686,774
	4,686,775
95	4,686,776
116	4,686,777
117	4,686,778
168	4,686,779

CLASS 36

121	4,686,780
132	4,686,781

CLASS 37

103	4,686,782

CLASS 40

304	4,686,783
406	4,686,784
606	4,686,785

CLASS 42

1.12	4,686,786

CLASS 43

18.1	4,686,787
56	4,686,788
113	4,686,789

CLASS 44

51	4,687,490
	4,687,491

CLASS 47

9	4,686,790
29	4,686,791

CLASS 49

61	4,686,792
471	4,686,793

CLASS 51

59 R	4,686,794
125	4,686,795
144	4,686,796
170 TL	4,686,797
216 LP	4,686,798

CLASS 52

8	4,686,799
81	4,686,800
	4,686,801
94	4,686,802
97	4,686,803
169.6	4,686,804
208	4,686,805
309.4	4,686,806
314	4,686,807
410	4,686,808
528	4,686,809
743	4,686,810

CLASS 53

118	4,686,812
446	4,686,813
459	4,686,814
469	4,686,815
536	4,686,816
567	4,686,817

CLASS 55

1	4,687,492
2	4,687,493
37	4,687,494
46	4,687,495
73	4,687,496
349	4,687,497

CLASS 56

192	4,686,818
295	4,686,819
341	4,686,820

CLASS 57

22	4,686,821

CLASS 60

39.02	4,686,822
39.32	4,686,823
231	4,686,824
243	4,686,825
261	4,686,826
286	4,686,827
415	4,686,828
464	4,686,829
603	4,686,830
645	4,686,831
676	4,686,832

CLASS 62

17	4,687,498
24	4,687,499
68	4,686,833
209	4,686,834
223	4,686,835
235.1	4,686,836

CLASS 63

12	4,686,837

CLASS 65

36	4,687,500
103	4,687,501
164	4,687,502
174	4,687,503
326	4,687,504

CLASS 66

71	4,686,838
75.2	4,686,839

CLASS 70

54	4,686,840
276	4,686,841
312	4,686,842
366	4,686,843

CLASS 71

27	4,687,505
92	4,687,506
	4,687,507
	4,687,508
121	4,687,509

CLASS 72

13	4,686,844
238	4,686,845

CLASS 73

23	4,686,846
	4,686,847
38	4,686,848
	4,686,849
45.5	4,686,850
49.2	4,686,851
61 R	4,686,852
61.2	4,686,853
86	4,686,854
146.8	4,686,855
204	4,686,856
304 R	4,686,857
517 B	4,686,858
761	4,686,859
856	4,686,860
862.68	4,686,861

CLASS 74

44	4,686,862
425	4,686,863
431	4,686,864
475	4,686,865
479	4,686,866
534.6	4,686,867
606 R	4,686,868
745	4,686,869
828	4,686,870
866	4,686,871
869	4,686,872

CLASS 75

0.5 B	4,687,510
	4,687,511
58	4,687,512
88	4,687,513
109	4,687,514
246	4,687,515

CLASS 81

57.35	4,686,873
461	4,686,874

CLASS 83

54	B1 4,108,029
177	4,686,877
425.2	4,686,875
455	4,686,876

CLASS 84

1.01	4,686,880
1.03	B1 3,515,792
1.15	4,686,881
291	4,686,882
313	4,686,883
404	4,686,878
440	4,686,879

CLASS 89

1.816	4,686,884
6.5	4,686,885
11	4,686,886
33.16	4,686,887
37.13	4,686,888

CLASS 92

117 A	4,686,889

CLASS 98

2	4,686,890
36	4,686,891
107	4,686,892
119	4,686,893

CLASS 99

386	4,686,894
440	4,686,895
482	4,686,896

CLASS 100

214	4,686,897

CLASS 101

18	4,686,898
93.04	4,686,899
93.48	4,686,900
148	4,686,901
424	4,686,902

CLASS 102

202.5	4,686,903
439	4,686,904
444	4,686,905

CLASS 104

209	4,686,906

CLASS 105

4.1	4,686,907
315	4,686,908
378	4,686,909

CLASS 106

90	4,687,516
96	4,687,517
161	4,687,518
211	4,687,519
271	4,687,520
291	4,687,521

CLASS 108

153	4,686,910

CLASS 109

1 S	4,686,911
59 T	4,686,912

CLASS 110

110	4,686,913

CLASS 111

73	4,686,914

CLASS 112

121.12	4,686,915
	4,686,916
311	4,686,917
410	4,686,918

CLASS 114

45	4,686,919
48	4,686,920
102	4,686,921
124	4,686,922
140	4,686,923
219	4,686,924
224	4,686,925
230	4,686,926
312	4,686,927

CLASS 116

137 R	4,686,928
318	4,686,929

CLASS 118

24	4,686,930
50	4,686,931
419	4,686,932
623	4,686,933
651	4,686,934
658	4,686,935
661	4,686,936

CLASS 119

1	4,686,937

CLASS 122

4 D	4,686,939
4 R	4,686,938
31 R	4,686,940

CLASS 123

26	4,686,941
41.21	4,686,942
41.74	4,686,943
52 MV	4,686,944
90.22	4,686,945
90.41	4,686,946
90.58	4,686,947
193 H	4,686,948
306	4,686,949
339	4,686,950
527	4,686,951
572	4,686,952
606	4,686,953
607	4,686,954

CLASS 124

23 R	4,686,955
41 A	4,686,956

CLASS 126

41 R	4,686,957
369.2	4,686,958
400	4,686,959
422	4,686,960
433	4,686,961

CLASS 128

1 R	4,686,962
4	4,686,963
	4,686,964
	4,686,965
17	4,686,966
57	4,686,967
72	4,686,968
80 C	4,686,969
92 V	4,686,972
92 VT	4,686,971
92 YM	4,686,970
92 YZ	4,686,973
204.23	4,686,974
	4,686,975
206.15	4,686,976
207.17	4,686,977
303 R	4,686,978
303.1	4,686,979
	4,686,992
303.13	4,686,980
303.17	4,686,981
305	4,686,982
325	4,686,983
343	4,686,984
344	4,686,985
396	4,686,986
419 PG	4,686,987
	4,686,989
419 PT	4,686,988
	4,686,990
421	4,686,991
581	4,686,993
586	4,686,994
640	4,686,995
642	4,686,996
653	4,686,997
670	4,686,998
716	4,686,999
760	4,687,000
767	4,687,001
774	4,687,002
777	4,687,003
798	4,687,004

CLASS 131

202	4,687,005
257	4,687,006
296	4,687,007
335	4,687,008
336	4,687,009

CLASS 132

33 R	4,687,010

CLASS 134

8	4,687,522
30	4,687,523
167 C	4,687,011

CLASS 135

75	4,687,012

CLASS 136

212	4,687,879
246	4,687,880
255	4,687,881

CLASS 137

7	4,687,013
14	4,687,014
238	4,687,015
240	4,687,016
315	4,687,017
340	4,687,018
375	4,687,019
486	4,687,020
526	4,687,021
531	4,687,022
533.13	4,687,023
615	4,687,024
625.17	4,687,025

CLASS 138

89	4,687,026
149	4,687,027

CLASS 139

71	4,687,028
84	4,687,029
91	4,687,030

CLASS 141

9	4,687,031
18	4,687,032
59	4,687,033
69	4,687,034

CLASS 144

2 R	4,687,035

CLASS 148

11.5 A	4,687,524
336	4,687,525

CLASS 150

118	4,687,036

CLASS 152

209 R	4,687,037

CLASS 156

64	4,687,526
72	4,687,527
150	4,687,528
163	4,687,529
215	4,687,530
245	4,687,531
251	4,687,532
307.3	4,687,533
308.6	4,687,534
361	4,687,535
556	4,687,536
612	4,687,537
616 R	4,687,538
626	4,687,539
630	4,687,540
643	4,687,541
	4,687,542
	4,687,543
	4,687,544
651	4,687,545

CLASS 159

2.1	4,687,546
3	4,687,547

CLASS 160

84 R	4,687,038
	4,687,039
107	4,687,040
168 R	4,687,041

CLASS 162

216	4,687,548
352	4,687,549

CLASS 164

80	4,687,042
97	4,687,043
100	4,687,044
262	4,687,045
442	4,687,046
476	4,687,047

CLASS 165

1	4,687,048
	4,687,049
27	4,687,050

61 4,687,051
82 4,687,052
133 4,687,053

CLASS 166

66.4 4,687,054
72 4,687,055
88 4,687,056
252 4,687,057
263 4,687,058
271 4,687,059
285 4,687,060
308 4,687,061
366 4,687,062
382 4,687,063

CLASS 171

27 4,687,064

CLASS 172

167 4,687,065

CLASS 174

102 SC 4,687,882
126 S 4,687,883
130 4,687,884

CLASS 175

340 4,687,066
4,687,067

CLASS 178

18 4,687,885

CLASS 180

8.2 4,687,068
9.1 4,687,071
68.2 4,687,069
74 4,687,070
219 4,687,072

CLASS 181

136 B1 4,556,122

CLASS 182

2 4,687,073
3 4,687,074
121 4,687,075
178 4,687,076
235 4,687,077

CLASS 187

17 4,687,078

CLASS 188

268 4,687,079

CLASS 192

0.076 4,687,083
13 A 4,687,080
53 F 4,687,081
55 4,687,082
85 CA 4,687,084
89 W 4,687,085
106.2 4,687,086
4,687,087
133 4,687,088

CLASS 194

230 4,687,089
317 4,687,090

CLASS 198

345 4,687,091
461 4,687,092
465.2 4,687,093

CLASS 200

6 B 4,687,886
16 F 4,687,887
38 R B1 3,727,015
51.1 4,687,888
61.62 4,687,889
148 B 4,687,890
153 G 4,687,891

CLASS 202

165 4,687,550

CLASS 204

11 4,687,551
15 4,687,552
16 4,687,553
23 4,687,554
26 4,687,555
29 4,687,556
44 4,687,557
59 R 4,687,558
110 4,687,559
164 4,687,560
182.5 4,687,561
206 4,687,562
224 M 4,687,563
243 R 4,687,564
258 4,687,565
279 4,687,566

CLASS 206

44 R 4,687,094

234 4,687,095
315.9 4,687,096
334 4,687,097
340 4,687,098
362 4,687,099
403 4,687,100
444 4,687,101
566 4,687,103
607 4,687,104

CLASS 208

48 AA 4,687,567
251 H 4,687,568
407 4,687,569
431 4,687,570

CLASS 209

167 4,687,571
546 4,687,105
552 4,687,106
556 4,687,107

CLASS 210

114 4,687,572
143 4,687,573
151 4,687,574
169 4,687,575
200 4,687,576
288 4,687,577
321.1 4,687,578
347 4,687,579
651 4,687,580
670 4,687,581
677 4,687,582
739 4,687,583
769 4,687,584
787 4,687,585

CLASS 211

13 4,687,108

CLASS 212

76 4,687,109
147 4,687,110

CLASS 215

32 4,687,111
216 4,687,112
230 4,687,113
256 4,687,114
355 4,687,115

CLASS 219

8.5 4,687,892
10.41 4,687,893
10.43 4,687,894
10.55 A 4,687,895
10.77 4,687,896
56.21 4,687,897
56.22 4,687,898
76.14 4,687,899
111 4,687,900
121 ET 4,687,902
121 LG 4,687,901
241 4,687,903
271 4,687,904
336 4,687,905
364 4,687,906
373 4,687,907
400 4,687,908
502 4,687,909
506 4,687,910
553 4,687,911

CLASS 220

270 4,687,116
306 4,687,117
444 4,687,118

CLASS 221

101 4,687,119

CLASS 222

1 4,687,120
64 4,687,121
183 4,687,122
518 4,687,123

CLASS 224

42.24 4,687,124

CLASS 226

21 4,687,125

CLASS 227

10 4,687,126

CLASS 229

41 R 4,687,128
44 R 4,687,129
114 4,687,130

CLASS 231

2 R 4,687,131

CLASS 235

379 Re.32,478

463 4,687,912

CLASS 236

35 4,687,132

CLASS 237

2 B 4,687,133

CLASS 238

349 4,687,134

CLASS 239

8 X 4,687,136
81 4,687,135
124 4,687,137
126 4,687,138
205 4,687,139
332 4,687,140
520 4,687,141
533.3 4,687,142
542 4,687,143

CLASS 241

49 4,687,144
57 4,687,145
79.3 4,687,146
101 A 4,687,147

CLASS 242

18 PW 4,687,148
47.01 4,687,149
4,687,150
54 R 4,687,151
55 4,687,152
56.8 4,687,153
96 4,687,154
107.3 4,687,155
107.4 A 4,687,156
199 4,687,157

CLASS 244

63 4,687,158
134 A 4,687,159
142 4,687,160
171 4,687,161
213 4,687,162

CLASS 246

428 4,687,163

CLASS 248

27.3 4,687,164
274 4,687,165
279 4,687,166
282 4,687,167
490 4,687,169
539 4,687,168
543 4,687,170
550 4,687,171
551 4,687,172
603 4,687,173
638 4,687,174
661 4,687,175

CLASS 249

53 R 4,687,178

CLASS 250

201 4,687,913
4,687,914
4,687,915
4,687,916
4,687,917
203 R 4,687,923
205 4,687,918
4,687,919
4,687,920
207 4,687,921
213 VT 4,687,922
216 4,687,924
223 R 4,687,925
226 4,687,926
231 P 4,687,927
231 SE 4,687,928
282 4,687,929
309 4,687,930
310 4,687,931
327.2 4,687,932
334 4,687,933
343 4,687,934
361 R 4,687,935
397 4,687,936
423 F 4,687,938
484.1 4,687,937
492.2 4,687,939
4,687,940
506.1 4,687,941
556 4,687,942
570 4,687,943
578 4,687,944

CLASS 251

9 4,687,176
25 4,687,177
58 4,687,179
122 4,687,180
223 4,687,181

CLASS 252

8.551 4,687,586
11 4,687,587
67 4,687,588
70 Re.32,477
73 4,687,589
75 4,687,590
90 4,687,591
99 4,687,592
182 4,687,593
352 4,687,594
387 4,687,595
510 4,687,596
512 4,687,597
518 4,687,598
627 4,687,600
638 4,687,601

CLASS 254

93 R 4,687,182

CLASS 260

501.12 4,687,602

CLASS 261

24 4,687,603
29 4,687,604

CLASS 264

0.5 4,687,605
8 4,687,606
29.5 4,687,607
40.1 4,687,614
62 4,687,608
132 4,687,609
211.14 4,687,610
236 4,687,611
322 4,687,612
328.15 4,687,613
557 4,687,615

CLASS 266

156 4,687,183
270 4,687,184
274 4,687,185
287 4,687,186

CLASS 267

64.18 4,687,187
140.1 4,687,188

CLASS 269

22 4,687,189
239 4,687,190

CLASS 270

53 4,687,191

CLASS 271

119 4,687,192
184 4,687,193

CLASS 272

63 4,687,194
69 4,687,195
4,687,196
72 4,687,197
114 4,687,198

CLASS 273

93 R 4,687,199
148 B 4,687,200
153 R 4,687,201
157 R 4,687,202
4,687,203
162 E 4,687,204
169 4,687,205
262 4,687,206
271 4,687,207
411 4,687,208
4,687,209
425 4,687,210

CLASS 277

12 4,687,127
50 4,687,211
205 4,687,212

CLASS 280

5.26 4,687,213
79.1 R 4,687,215
91 4,687,214
4,687,216
153 R 4,687,217
242 WC 4,687,218
414.1 4,687,219
477 4,687,220
605 4,687,221
678 4,687,222
707 4,687,223
718 4,687,224
758 4,687,225

CLASS 281

45 4,687,226
4,687,227

CLASS 282

9 R 4,687,228

29 B 4,687,229

CLASS 283

34 4,687,230
82 4,687,231

CLASS 285

31 4,687,232
55 4,687,233
244 4,687,234
281 4,687,235

CLASS 290

37 R 4,687,945
40 R 4,687,946

CLASS 292

16 4,687,236
78 4,687,237
137 4,687,238
172 4,687,239
320 4,687,240

CLASS 294

61 4,687,241
64.1 4,687,242
86.4 4,687,243
86.41 4,687,244
87.1 4,687,245

CLASS 296

97 G 4,687,246
136 4,687,247

CLASS 297

129 4,687,248
184 4,687,249
320 4,687,250
337 4,687,251
374 4,687,252
478 4,687,253
481 4,687,254
488 4,687,255

CLASS 300

21 4,687,256
4,687,257

CLASS 303

3 4,687,258
114 4,687,259
119 4,687,260

CLASS 305

57 4,687,261

CLASS 307

17 4,687,947
38 4,687,948
246 4,687,949
261 4,687,952
269 4,687,951
270 4,687,953
279 4,687,954
290 4,687,955
310 4,687,956
311 4,687,957
425 4,687,958
465 4,687,959
642 4,687,950

CLASS 310

42 4,687,960
186 4,687,961
316 4,687,962

CLASS 312

276 4,687,262

CLASS 313

17 4,687,963
237 4,687,964
318 4,687,965
440 4,687,966
477 R 4,687,967
509 4,687,968
625 4,687,969

CLASS 315

106 4,687,970
244 4,687,971
371 4,687,972
4,687,973
375 4,687,974

CLASS 318

261 4,687,975
432 4,687,976
492 4,687,977
599 4,687,978
638 4,687,979
640 4,687,980
696 4,687,981
763 4,687,982

CLASS 322

28 4,687,983

CLASS 323

315 4,687,984
323 4,687,985

CLASS 324

71.1 4,687,986
71.3 4,687,987
73 AT 4,687,988
158 MG 4,687,990
169 4,687,991
232 4,687,992
244 4,687,993
251 4,687,994
341 4,687,995
436 4,687,996
439 4,687,997
758 R 4,687,989

CLASS 328

58 4,687,998

CLASS 329

109 4,687,999

CLASS 330

261 Re.32,479
269 4,688,000
273 4,688,001
298 4,688,002

CLASS 331

25 4,688,003
49 4,688,004
117 R 4,688,005

CLASS 333

113 4,688,006
137 4,688,007
252 4,688,009
253 4,688,008

CLASS 335

128 4,688,010
159 4,688,011
276 4,688,012

CLASS 337

168 4,688,013

CLASS 338

34 4,688,014
4,688,015

CLASS 340

347 AD 4,688,018
347 DD 4,688,016
347 NT 4,688,017
347 P 4,688,019
365 VL 4,688,020
521 4,688,021
540 4,688,022
545 4,688,023
550 4,688,024
571 4,688,025
572 4,688,026
604 4,688,027
625 4,688,028
754 4,688,029
781 4,688,030
793 4,688,031
799 4,688,032
800 4,688,033
825.48 4,688,034
825.52 4,688,035
825.69 4,688,036
825.72 4,688,037
870.02 4,688,038
870.17 4,688,039

CLASS 342

3 4,688,040
17 4,688,041
19 4,688,042
149 4,688,043
160 4,688,044
377 4,688,045
456 4,688,046

CLASS 343

719 4,687,445

CLASS 346

1.1 4,688,047
4,688,048
4,688,049
76 PH 4,688,050
4,688,051
140 R 4,688,052
4,688,053
4,688,054
4,688,055
4,688,056

CLASS 350

3.66 4,687,281
3.7 4,687,282
6.8 4,687,283

96.16 4,687,284
96.18 4,687,285
96.19 4,687,286
96.20 4,687,287
4,687,288
4,687,289
4,687,290
96.21 4,687,291
4,687,292
96.23 4,687,293
4,687,294
96.33 Re.32,475
96.34 4,687,295
128 4,688,093
247 4,687,296
252 4,687,297
334 4,687,298
336 4,687,299
4,687,300
401 4,687,301
427 4,687,302
4,687,303
526 4,687,304
624 4,687,305

CLASS 351

51 4,687,306

CLASS 354

21 4,687,307
82 4,687,308
4,687,309
115 4,687,310
217 4,687,311
295 4,687,312
320 4,687,313
400 4,687,314

CLASS 355

3 FU 4,687,315
3 R 4,687,316
4,687,317
5 4,687,318
10 4,687,319
14 R 4,687,320
15 B1 3,647,293
41 4,687,321
55 4,687,322
73 4,687,323

CLASS 356

1 4,687,324
4,687,325
5 4,687,326
70 4,687,327
328 4,687,329
350 4,687,330
4,687,331
353 4,687,332
382 4,687,333
384 4,687,328
404 4,687,334
416 4,687,335
436 4,687,336
437 4,687,337
446 4,687,338

CLASS 357

22 4,688,061
4,688,062
23.13 4,688,065
23.5 4,688,078
23.6 4,688,063
4,688,064
24 4,688,066
29 4,688,067
30 4,688,068
34 4,688,069
40 4,688,070
41 4,688,071
45 4,688,072
56 4,688,073
79 4,688,074
80 4,688,075
81 4,688,076
4,688,077

CLASS 358

10 4,688,079
19 4,688,081
21 R 4,688,082
30 4,688,083
31 4,688,080
36 4,688,084
44 4,688,085
95 4,688,086
100 4,688,087
101 4,688,088
105 4,688,089
108 4,688,090
109 4,688,091
4,688,092
148 4,688,094
160 4,688,095
167 4,688,096
213.19 4,688,098
214 4,688,099
257 4,688,108
261 4,688,100
299 4,688,101
310 4,688,102
326 4,688,103
332 4,688,104
335 4,688,105
342 4,688,106
4,688,107

CLASS 360

10.2 4,688,109
19.1 4,688,110
36.2 4,688,111
60 4,688,112
67 4,688,113
70 4,688,114
4,688,115
72.2 4,688,116
72.3 4,688,117
75 4,688,118
77 4,688,119
85 4,688,120
94 4,688,121
96.5 4,688,122
97 4,688,123
99 4,688,124
4,688,125
130.24 4,688,126
132 4,688,127
4,688,128
133 4,688,129
135 4,688,130
137 4,688,131

CLASS 361

19 4,688,132
45 4,688,133
4,688,134
118 4,688,135
120 4,688,136
141 4,688,137
154 4,688,138
4,688,139
232 4,688,140
233 4,688,141
332 4,688,142
335 4,688,143
345 4,688,144
349 4,688,145
364 4,688,146
385 4,688,147
395 4,688,148
399 4,688,149
403 4,688,150
405 4,688,151
408 4,688,152
433 4,688,153

CLASS 362

147 4,688,154
352 4,688,155
354 4,688,156

CLASS 363

20 4,688,157
21 4,688,158
4,688,159
4,688,160
37 4,688,161
80 4,688,162
96 4,688,163
98 4,688,164
132 4,688,165

CLASS 364

200 4,688,166
4,688,167
4,688,168
4,688,169
4,688,170
4,688,171
4,688,172
300 4,688,195
405 4,688,173
4,688,174
410 Re.32,480
414 4,688,175
449 4,688,176
468 4,688,177
470 4,688,178
474 4,688,179
477 4,688,180
521 4,688,181
523 4,688,182
554 4,688,183
560 4,688,184
563 4,688,185
571 4,688,194
764 4,688,186
825 4,688,187
900 4,688,188
4,688,189
4,688,190
4,688,191
4,688,192
4,688,193

CLASS 365

222 4,688,196
230 4,688,197

CLASS 366

305 4,687,339

CLASS 367

46 4,688,198
137 4,688,199
149 4,688,200

CLASS 368

10 4,687,340
109 4,687,341

CLASS 369

44 4,688,201
4,688,202
48 4,688,203
59 4,688,204
4,688,205
291 4,688,206

CLASS 370

13 4,688,207
15 4,688,208
4,688,209
18 4,688,210
58 4,688,211
85 4,688,212
93 4,688,213
94 4,688,214
102 4,688,215
104 4,688,216
4,688,217
106 4,688,218

CLASS 371

10 4,688,219
4,688,220
13 4,688,221
25 4,688,222
27 4,688,223
31 4,688,224
37 4,688,225
57 4,688,226

CLASS 372

2 4,688,227
18 4,688,228
87 4,688,229
109 4,688,230

CLASS 373

138 4,688,231

CLASS 374

32 4,687,342
56 4,687,343
124 4,687,344

CLASS 375

10 4,688,234
58 4,688,233
87 4,688,232
102 4,688,235

CLASS 376

123 4,687,616
137 4,687,617
152 4,687,618
209 4,687,620
4,687,621
254 4,687,622
259 4,687,623
260 4,687,619
264 4,687,624
292 4,687,625
298 4,687,626
333 4,687,627
353 4,687,628
428 4,687,629
446 4,687,630
4,687,631

CLASS 377

48 4,688,236
4,688,237

CLASS 378

4 4,688,238
70 4,688,240
137 4,688,241
141 4,688,239
154 4,688,242
187 4,688,243

CLASS 379

58 4,688,244
410 4,688,245

CLASS 380

9 4,688,246
15 4,688,097
19 4,688,247
20 4,688,248
4,688,249
23 4,688,250
34 4,688,251
48 4,688,257

CLASS 381

4 4,688,252
7 4,688,253
15 4,688,254
16 4,688,255
46 4,688,256
103 4,688,258

CLASS 384

44 4,687,345
99 4,687,346
141 4,687,347
255 4,687,348
477 4,687,349
481 4,687,350
541 4,687,351

CLASS 400

73 4,687,352
76 4,687,353
121 4,687,354
124 4,687,355
144.2 4,687,356
208 4,687,357
4,687,358
218 4,687,359
241.1 4,687,360
322 4,687,361
630 4,687,362

CLASS 401

65 4,687,363
127 4,687,364

CLASS 403

2 4,687,365
297 4,687,366
322 4,687,367
343 4,687,368

CLASS 404

12 4,687,369
15 4,687,370

CLASS 405

125 4,687,371
128 4,687,372
4,687,373
146 4,687,374
4,687,375
168 4,687,376
169 4,687,377
171 4,687,378
195 4,687,379
204 4,687,380
264 Re.32,476

CLASS 406

52 4,687,381
168 4,687,382

CLASS 407

46 4,687,383

CLASS 408

16 4,687,384
76 4,687,385
88 4,687,386
144 4,687,387
230 4,687,388

CLASS 409

81 4,687,389
92 4,687,390
201 4,687,391

CLASS 411

6 4,687,392
351 4,687,393
361 4,687,394
4,687,395
503 4,687,396
4,687,397
4,687,398
518 4,687,399

CLASS 414

4 4,687,400
22 4,687,401
24.6 4,687,402
32 4,687,403
217 4,687,408
276 4,687,404
304 B1 4,157,761
408 4,687,405
701 4,687,406
703 4,687,407
750 4,687,409

CLASS 415

17 4,687,410
122 R 4,687,411
134 4,687,412
190 4,687,413

CLASS 416

63 4,687,414
196 A 4,687,415
223 A 4,687,416

CLASS 417

49 4,687,417
50 4,687,418
222 4,687,419
240 4,687,420
296 4,687,421
345 4,687,422
379 4,687,423
384 4,687,424
462 4,687,425
539 4,687,426

CLASS 418

34 4,687,427

CLASS 419

45 4,687,632

CLASS 420

481 4,687,633
578 B1 3,905,809

CLASS 422

7 4,687,634
26 4,687,635
57 4,687,636
62 4,687,637
73 4,687,638
112 4,687,639
120 4,687,640
133 4,687,641
140 4,687,642
150 4,687,643
159 4,687,644
184 4,687,645
248 4,687,646

CLASS 423

53 4,687,647
242 4,687,648
4,687,649
248 4,687,650
315 4,687,651
327 4,687,652
329 4,687,653
4,687,654
344 4,687,655
361 4,687,656
412 4,687,657

CLASS 424

9 4,687,658
4,687,659
38 4,687,661
44 4,687,662
52 4,687,663
85 4,687,664
86 4,687,665
88 4,687,666
195.1 4,687,667
465 4,687,660

CLASS 425

60 4,687,428
133.1 4,687,430
192 R 4,687,429
229 4,687,431
387.1 4,687,432
464 4,687,433
556 4,687,434

CLASS 426

17 4,687,668
72 4,687,669
297 4,687,670
384 4,687,671
524 4,687,672
549 4,687,673
4,687,674

CLASS 427

2 4,687,675
3 4,687,676
8 4,687,677
34 4,687,678
38 4,687,679
4,687,680
40 4,687,681
54.1 4,687,825
94 4,687,682
160 4,687,683
248.1 4,687,684
340 4,687,827
366 4,687,685
421 4,687,686

CLASS 428

34 4,687,687
35 4,687,688
4,687,689
36 4,687,690
73 4,687,691
137 4,687,692
148 4,687,693
156 4,687,694
192 4,687,695
4,687,696
201 4,687,697
209 4,687,698
213 4,687,699
4,687,700
216 4,687,701
308.4 4,687,702
323 4,687,703
328 4,687,704
329 4,687,705
330 4,687,706
336 4,687,707
339 4,687,708
425.9 4,687,709
447 4,687,710
515 4,687,711
611 4,687,712
628 4,687,713

CLASS 429

27 4,687,714
41 4,687,715
145 4,687,716
152 4,687,717
190 4,687,718
234 4,687,719

CLASS 430

2 4,687,720
58 4,687,721
59 4,687,722
65 4,687,723
84 4,687,724
138 4,687,725
175 4,687,726
4,687,727
270 4,687,728
271 4,687,729
324 4,687,730
372 4,687,731

CLASS 431

1 4,687,435
173 4,687,436
277 4,687,437

CLASS 432

57 4,687,438
192 4,687,439
194 4,687,440

CLASS 433

8 4,687,441
63 4,687,442
173 4,687,443

CLASS 434

114 4,687,444

CLASS 435

6 4,687,732
7 4,687,733
4,687,734
4,687,735
4,687,736
68 4,687,737
4,687,738
69 4,687,739
4,687,740
189 4,687,741
234 4,687,742
240.49 4,687,743
242 4,687,744
278 4,687,745
292 4,687,746

CLASS 436

518 4,687,747
526 4,687,748

CLASS 437

5 4,686,760
4,686,761
34 4,686,758
36 4,686,762
51 4,686,759
4,686,763

CLASS 439

55 4,687,268
62 4,687,267
68 4,687,265
77 4,687,266
92 4,687,264
108 4,687,263
161 4,687,269
271 4,687,272
350 4,687,270
4,687,271
404 4,687,275
411 4,687,273
426 4,687,274

CLASSIFICATION OF PATENTS

353	4,687,446
557	4,687,276
578	4,687,279
621	4,687,277
842	4,687,278
874	4,687,280
CLASS 440	
11	4,687,447
53	4,687,448
61	4,687,449
89	4,687,450
CLASS 441	
94	4,687,451
131	4,687,452
CLASS 445	
4	4,687,453
5	4,687,454
CLASS 446	
52	4,687,455
158	4,687,456
175	4,687,457
222	4,687,458
268	4,687,459
316	4,687,460
CLASS 455	
12	4,688,259
76	4,688,261
89	4,688,262
142	4,688,263
168	4,688,264
223	4,688,265
601	4,688,260
612	4,688,266
619	4,688,267
	4,688,268
CLASS 474	
148	4,687,461
CLASS 493	
100	4,687,462
CLASS 494	
83	4,687,463
CLASS 501	
5	4,687,749
10	4,687,750
32	4,687,751
121	4,687,752
CLASS 502	
5	4,687,753
65	4,687,754
159	4,687,755
165	4,687,756
220	4,687,757
CLASS 503	
204	4,688,057
209	4,688,058
214	4,688,060
220	4,688,059
CLASS 512	
27	4,687,599
CLASS 514	
11	4,687,758
18	4,687,759
	4,687,760
26	4,687,761
34	4,687,762
53	4,687,763
54	4,687,764
56	4,687,765
78	4,687,766
89	4,687,767
102	4,687,768
202	4,687,769
211	4,687,770
253	4,687,771
273	4,687,772
280	4,687,773
293	4,687,774
300	4,687,775
312	4,687,776
342	4,687,777
419	4,687,778
456	4,687,779
492	4,687,780
557	4,687,781
561	4,687,782
693	4,687,783
CLASS 518	
714	4,687,784
CLASS 521	
106	4,687,785
110	4,687,786
131	4,687,787
163	4,687,788
CLASS 523	
122	4,687,789
130	4,687,790
161	4,687,791
177	4,687,792
200	4,687,793
351	4,687,794
436	4,687,795
466	4,687,796
CLASS 524	
94	4,687,797
100	4,687,798
	4,687,799
103	4,687,800
104	4,687,801
411	4,687,802
413	4,687,803
505	4,687,804
569	4,687,805
765	4,687,806
827	4,687,807
CLASS 525	
54.1	4,687,808
	4,687,820
57	4,687,809
74	4,687,810
100	4,687,811
111	4,687,812
131	4,687,813
242	4,687,814
271	4,687,815
279	4,687,816
375	4,687,817
404	4,687,818
425	4,687,819
CLASS 526	
247	4,687,821
265	4,687,822
284	4,687,823
292.2	4,687,824
CLASS 527	
201	4,687,826
400	4,687,828
CLASS 528	
14	B1 4,138,543
17	4,687,829
64	4,687,830
	4,687,831
97	4,687,832
125	4,687,833
291	4,687,834
300	4,687,835
353	4,687,836
496	4,687,837
	4,687,838
CLASS 530	
324	4,687,839
331	4,687,840
	4,687,841
CLASS 534	
607	4,687,842
CLASS 536	
18.3	4,687,843
CLASS 540	
467	4,687,844
CLASS 544	
54	4,687,845
140	4,687,846
251	4,687,847
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403	4,687,479
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4,687,449
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4,687,991
4,688,145
4,688,191

01	:	291,391			291,476	25	:	291,404		291,384			291,489			291,468
		291,426			291,478			291,409		291,397			291,490			291,469
06	:	291,387	09	:	291,405			291,416		291,411		43	: 291,480			291,470
		291,392			291,436			291,451		291,415			291,481			291,485
		291,394			291,495	26	:	291,467		291,420			291,482	49	:	291,427
		291,396	12	:	291,403			291,492		291,431			291,483	50	:	291,463
		291,425	13	:	291,389	32	:	291,457		291,493		44	: 291,398	51	:	291,446
		291,430	17	:	291,445	34	:	291,412	39	: 291,385		45	: 291,429			291,456
		291,455			291,459			291,414		291,402		47	: 291,380			291,460
		291,477			291,491			291,419		291,474		48	: 291,406			291,401
		291,479	23	:	291,417			291,458	42	: 291,381			291,447	55	:	291,466
08	:	291,475	24	:	291,465	36	:	291,383		291,438			291,464			

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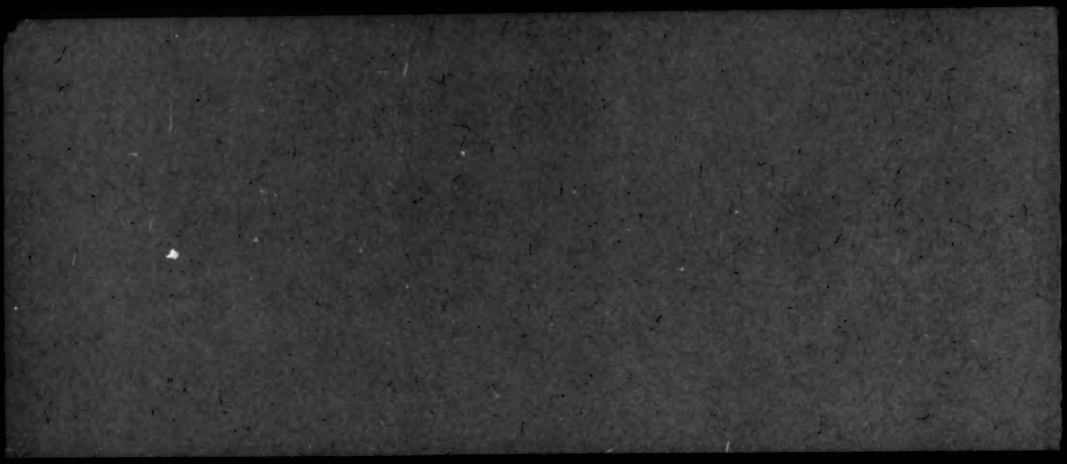
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